ARCHIVES OF OPHTHALMOLOGY.

CLINICAL REPORT OF A CASE OF TEMPORAL HEMIANOPSIA WITH RECOVERY, FOLLOWED BY RIGHT LATERAL HEMIANOPSIA, OPHTHALMOPLEGIA AND PARTIAL RECOVERY.

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Milwaukee, Wis.

(*With 7 perimetric double charts.*)

March 28, 1892.—L. E. R., æt. thirty-five, American, consulted Dr. Würdemann in reference to sudden loss of vision which he had experienced the day before.

About ten years ago while in Kansas he had contracted quotidian fever which developed into chronic malarial poisoning, continuing for four years. Since then he had been in poor health, being treated for general anæmia by various physicians but obtaining little benefit; going in his despair into the hands of empirics, and also absorbing any quantity of patent medicines. For several months he had been getting worse and at the consultation seemed in a condition of progressive emaciation. Height, 5 ft. 9 in.; weight in winter flannels 129 lbs.; skin sallow; expression anxious; very anæmic; unable to walk more than a block or two for several weeks; pulse at wrist scarcely perceptible; no heart, lung, or kidney lesion, although he had cystitis for years; has chronic atrophic rhinitis which gives him but little trouble; mucous membranes very pale and flabby. He had indigestion with flatulency and constipation; suffered much with insomnia and frontal headache for months; smokes several cigars a day, but seldom takes stimulants; denies all specific history. His father and one uncle died of cerebral apoplexy. Despite his weakness his brain was clear and he had been able to give moderate attention to business. Eyesight previously good.

The day before, had a severe headache and afterwards noticed that his sight was poor although he could still see to read. Also complained of hyperæsthesia of his finger tips and of both legs from the knee downwards. Vision : R, 6-12, Sn. .50 at .25 *m ;* L, 6-24, Sn. .50. Refraction emmetropic. The pupils were moderately dilated, responding to light and accommodation ; hemiopic pupillary reaction marked ; no strabismus or diplopia ; optic discs pale ; arteries much contracted ; veins larger than normal. Examination of the visual fields showed a typical temporal hemianopsia with absolute defect in the temporal halves excepting a clearly marked zone of about 7° around the fixation point in which central vision was preserved. In the nasal halves the color fields seemed contracted especially on the left side whereas form and the white fields were apparently normal. The nasal color fields bore relatively their proper relations to each other, central color vision being normal. There was no disturbance of the sense of locality. (See Figure 1.)

The patient was enjoined to remain perfectly quiet ; hot mustard foot-baths ordered ; blister placed at nape of neck and a saline administered. The next day vision was worse, he being unable to read large print ; had constant dull frontal headache ; pains in limbs ; could retain but little on his stomach ; some retching ; bowels had moved freely and for some days were kept fluid by salines. The hyperæsthesia of the limbs had increased until he complained of the contact of his clothes. On the 31st his condition was indeed pitiable. In the left eye the vision was practically *nil ;* the visual field for form and color being gone, while that for white was contracted almost to the fixation point. There was absolute loss of light sense outside of the central point. (See Fig. 2.)

In the right eye the field for white remained of the same size, although the sensitiveness of the retina was much diminished. The object squares of the perimeter were too small for appreciation so a 1½ *cm* square was used. Although color vision was abolished, sensation for form remained. Vision : R, fingers at 2 *m ;* L, could only see hand when held in line of sight. He had slight vertigo, and felt very weak. Sherry and egg was given morning and night, also weak milk punch several times during the day. A small quantity of rare beef was also taken. 0.30 quinine t. i. d. and sulfonal at night were ordered.

During the next four days there was a decided general and

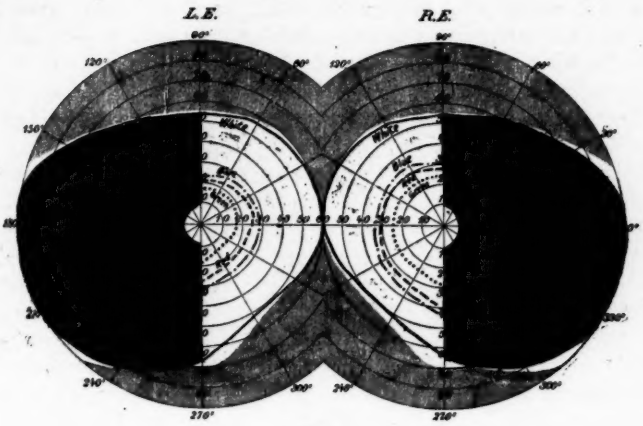

FIG 1.

Temporal hemianopsia with contracted color fields in nasal halves and preservation of central vision. First attack.

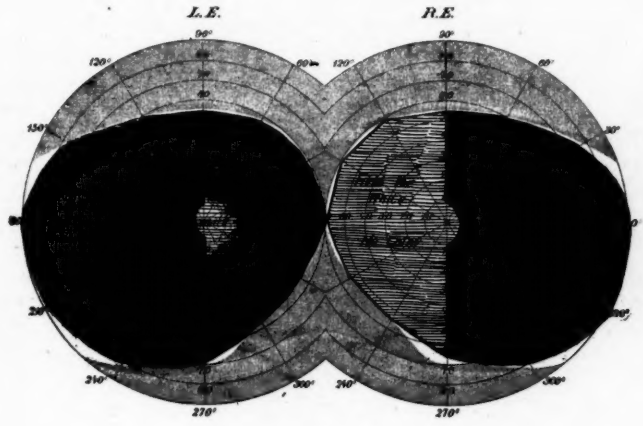

FIG 2.

Temporal hemianopsia for form and white ; colors abolished ; great contraction of left field.

visual improvement; when the field was again taken the central vision had returned on the right side and the small white square of the perimeter could be seen as a pure white. In the left the central area of quantitative vision seemed larger although appreciation of color was absent and white looked dirty. Sensation of form had returned. The hyperæsthesia of the lower limbs and finger tips had given way to numbness. He said "that he could not feel his feet." On the 6th of April, the local and general improvement was even more marked: No more headache; he slept better with the aid of sulfonal; the anxious look had left his face; the pupils were yet dilated, but responded slowly to light over the whole visual field of the right side. With the exception of an apparently much enlarged blind spot, white could be seen over the whole field. Hemianopia for color still remained and central vision was about the same. In the left eye, the defect was much less although distinctly hemianopic in character. Central vision was reduced even more than on the 30th of March, but white could be seen as clean white in the nasal half. On the 13th of April, the visual fields were as is shown in Fig. 3.

On account of the increasing central scotomata axial vision was abolished in both eyes, being reduced to the counting of fingers at one metre for both sides. An iron tonic and K I in gradually increasing doses to 4.00 a day was given in essence of pepsin. He was put upon a nitrogenous diet with meat three times a day. Two weeks later there was great improvement. He had gained 15 lbs. in weight. His appetite was good and bowels regular. The numbness of finger tips had increased to anæsthesia while that of the feet and limbs was passing away. Vision: R, $\frac{6}{60}$; L, fingers at 1 *m*. Pupils somewhat dilated, with slow response to light and accommodation. Central vision for white had returned in right, but there remained a scotoma for red, the field of which was peripherally contracted. Green was not recognized. In the left, the field had cleared, as is shown in Figure 4. In this eye there was an absolute central defect and the edges of the field were well defined.

About this time, in addition to the dietetic, tonic and alterative treatment, general massage was instituted. On May 4th, he weighed 149 lbs., and could walk a mile without fatigue. He could then read large print. Vision: R $\frac{6}{5}$, L $\frac{6}{60}$. The pupils were normal in size responding to light and accommodation. The optic nerves were pale and somewhat atrophic. The right

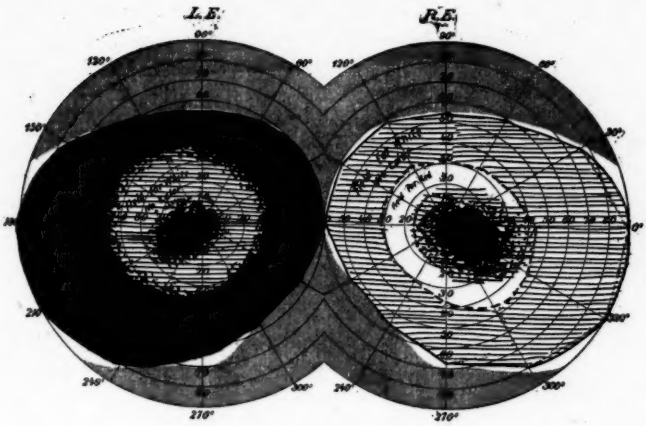

FIG 3.

Central scotomata forming.

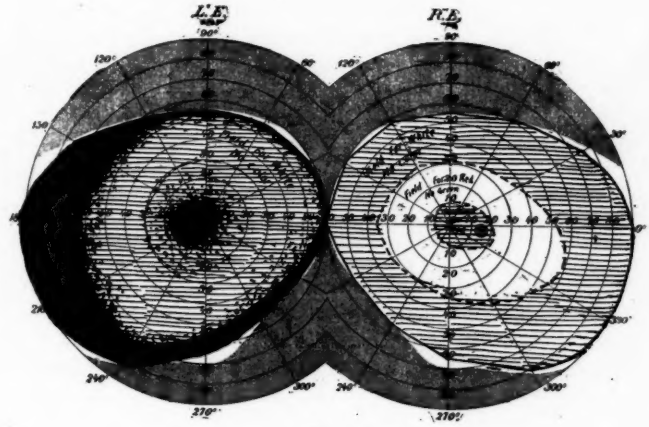

FIG 4.

Central scotomata disappearing.

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visual field was normal for white, while the color fields were greatly contracted. There was a small central scotoma for red and a larger for green. The fields for green in both eyes were relatively more diminished than for the other colors. (See Fig. 5.)

About the last of May the patient did not feel so well, had indefinite parasthesiæ, and was depressed in spirits. On examining the visual fields by the perimeter we were surprised to find that the limits of the color fields were poorly defined, and that they overlapped each other indiscriminately. The boundaries varied at times in such a manner that no reliable drawings of the fields could be obtained. He was told that there was not much more improvement in vision to be expected, but that any beneficial change in the general health might have its influence toward more restoration in vision. Accordingly an ocean voyage and sojourn in an equable climate for several months was recommended. May 27th, he departed for the Bermuda Islands. While in New York, he consulted Dr. H. Knapp who gave him the same prognosis.

He arrived in Bermuda in good spirits, and wrote in the early part of June that the trip had benefited him greatly, and that his vision was "steadier." We heard later that he had an attack of dysentery, and was fearful of a return of the old malaria. On July 21st, we were disagreeably surprised to receive a cablegram, stating that he was seriously ill and was on his way home. He arrived with his wife on the 26th. She said that he had been suffering from dysentery for two weeks, and several days before their departure had evinced signs of loss of reason. He had insomnia and hallucinations of sight and hearing, which had not been controlled by chloral and bromides administered by a Spanish physician, who had attended him there. He had several fainting spells with vomiting and headache. On the sailing day of the boat he had noticed that the left upper eyelid drooped, and he stumbled over objects in walking. He had complained of his eyes for several days previously. He arrived in Milwaukee in a stupid condition, and does not remember anything of the passage home.

He was seen at his residence, lying on a lounge in a comatose state. When disturbed he would wake up, but would not recognize any one and again relapse into the former apathetic condition. During the week of the journey he had taken little nourishment and was consequently emaciated. Skin was sallow; pulse had

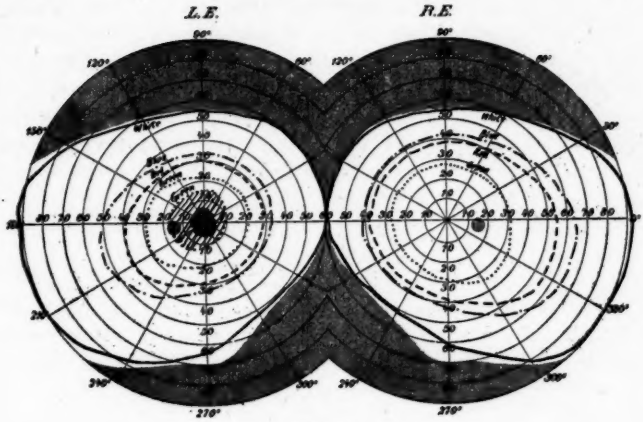

FIG 5.

Resulting vision after convalescence from first attack. Central scotomata for red and green in left.

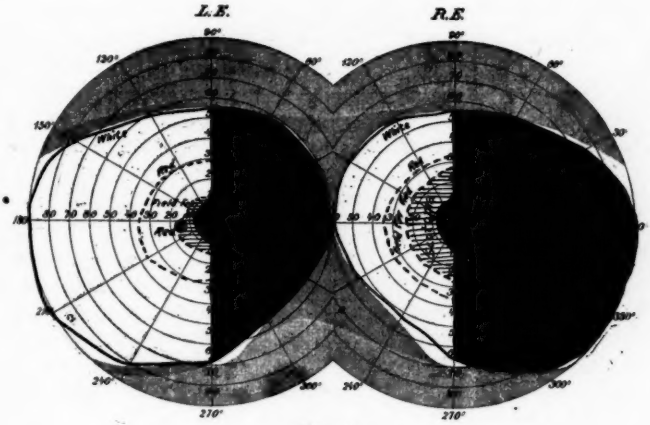

FIG. 6.

Right lateral homonymous hemianopsia; obliterated central vision and large central scotomata for red. Second attack.

been full and hard, but was now thready and weak; bowels had been constipated during the entire journey. He was lying with eyelids of both eyes partly closed. When aroused from the stupor it was seen that there was paralysis of left internal rectus and left ptosis. The pupils were dilated and immovable. Ophthalmoscopic examination showed veins very much enlarged and tortuous and the arteries apparently contracted; no evidence of papillitis or retinal hemorrhage. He said that he could not see the light when held close to either eye. There seemed to be no defect of speech other than what would be expected from one in such a condition, and no paralysis other than ocular was found. The same treatment, ordered at the time of the other apoplectic seizure, was given and his condition improved in a few hours. Dr. J. H. McBride was called in, and the conclusion arrived at as to recovery was unfavorable.

On the next day he was rational and could see a strong light when directed from the left. Wernicke's symptom could not then be obtained. In two days there was considerable improvement, and then hemiopic iris contraction was marked. August 4th, the visual field was carefully taken by the perimeter. (See Fig. 6.)

There was absolute defect of the right sides of each field, and central vision for about 10° in the left halves was likewise abolished. There were large central scotomata for red. Green could not be seen, and blue was not tried. Dividing line was exactly perpendicular in each field. Pupils dilated; hemiopic pupillary contraction marked; external squint less in degree; ptosis the same as at first. Vision: R, fingers 1 *m*; L, fingers ½ *m*. Diplopia present, but owing to the diminished visual acuity it was not troublesome. A few days later, a nitrogenous diet, large doses of iodides, and iron with stimulants were again administered.

August 29th.—When the patient had gained somewhat in strength he weighed but 125 lbs. Slight ptosis remained but the squint and diplopia had disappeared. Wernicke's symptom could be elicited with difficulty. Vision: fingers at 1 *m*. both eyes. Colors returning to nasal half of right field, and a few days later to temporal half of left. The defect for both sides was now only relative although large absolute central scotomata remained. In the hemianopic areas a 1½ *cm* white square could be distinguished but not the size commonly used with the perimeter. There was no disturbance of the sense of locality. The lamina

cribrosa of the whitened optic discs could be distinctly seen. Massage and salt baths were begun in addition to the other treatment. The vision gradually increased until Sept. 21st he could read the headlines of a newspaper with the right eye. He slept well without a hypnotic and headaches had disappeared. His weight was 149 lbs. A course of strychnine injections was then begun and pushed to his systemic limit (.03 at a dose). Tonics were given later and the iodides dropped for a while, being taken up again. He has since made several trips to Dakota with the view of establishing a business.

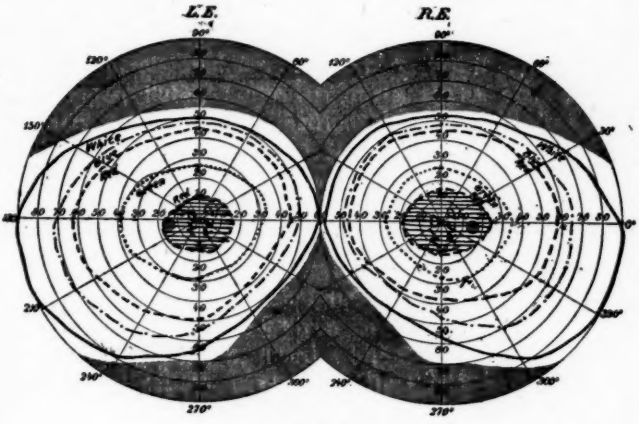

FIG. 7

Resulting vision after convalescence from second attack. Central scotomata for red, none for green.

December 20th.—He weighed 169½ lbs. in his overcoat (about twenty pounds more than he had ever weighed); could take any amount of exercise; memory good, and he was very anxious to get back to work; eyes straight; no ptosis; pupils normal; nerves slightly atrophic; Vision: R and L, $\frac{6}{60}$, with plus 2.00 read Sn. 1.50. (The enlargement by the glass helps him greatly so that he is enabled to decipher his correspondence with comparative ease.) The visual fields seemed contracted above and below for white, but this was probably due to limitation of the angular aperture of the lids by frowning in the endeavor to see distinctly. The fields

for red and blue seemed normal while for green there was a marked contraction. There were large central scotomata for red but none for green, which was perfectly distinguishable over the whole of its field. (See Fig. 7.)

This case has been reported in full as it is believed to be of interest on account of the uncommon occurrence in two distinct apoplectic attacks of the different forms of hemianopsia with peculiar changes in the central vision. The minuteness with which it was studied during the whole course by two observers verifying one another's work, gives a certain value to the report. The original lesion is believed to have been miliary aneurisms at the base of the brain, due to an atheromatous condition of the vessels engendered by the years of general anæmia. The first apoplectic attack was apparently due to a circumscribed hemorrhage at the anterior portion of the optic chiasm pressing upon the decussating fibres, thereby producing temporal hemianopsia, the clot afterwards being absorbed, but not before pressure on the optic nerve resulting in partial atrophy had occurred. The almost complete restoration of the visual fields under treatment is unusual. The erratic changes in the visual fields with the paræsthesia and mental disturbance that followed were not recognized at the time as prodromes of a second attack; the cause of which was probably debility resulting from the dysentery. At this time the hemorrhage was more posterior, involving the whole of the left optic tract and for a short time affecting the third nerve of the same side as is shown by the evanescent external squint and ptosis. No explanation of the peculiar changes in central vision and of the condition of the color fields is offered. The remarkable gain in general health may be reasonably ascribed to the method of treatment and avoidance of the "isms" and "pathies" to which he had previously been a victim.

Subsequent History to March 19, 1893.

The patient has not taken medicine for two months, and considers himself perfectly healthy. He has attended to all the requirements of his business during this period. In fact, he

approached me to-day about his qualifications for obtaining life insurance. He weighs over 170 pounds in his winter flannels. Continues baths, diet, and systematic exercise. There has been further improvement in sight, and he has discarded the use of the magnifying lenses except for fine print. Uses his eyes moderately. Vision: R $\frac{6}{24}$, L $\frac{6}{30}$, Sn. .60 at .25. White is well seen over entire area of both visual fields. Scotoma for red in left is about the same as in Fig. 7, taken December 20, 1892, while that of the right is hemianopic, the temporal field being wanting until the periphery is reached, where red is again seen. In both there remain central scotomata for red. The central vision for green is preserved, though its area is much contracted, occupying positions of the central scotomata for red. All colors in periphery of fields are well-defined. He notices an oscillation of his eyes when looking intently at small objects. This may be due to minute central scotomata for form and white, but which are too small for objective demonstration. This may be so as is exemplified by the state of the vision for red. On account of the central scotomata for this color he is red-blind in direct vision, but when the eyes are rolled he can distinguish the various shades of red. Sometimes the red color of small objects suddenly dawns upon him even after he has not appreciated their color for several minutes. Red in large masses is quickly perceived. Optic discs seem white and atrophic.

A REPLY TO DR. C. E. FINLAY'S CRITICISM OF MY INVESTIGATIONS AND VIEWS ON THE ORIGIN OF SYMPATHETIC OPHTHALMIA.

By ROBERT L. RANDOLPH, M.D.

ASSISTANT OPHTHALMIC AND AURAL SURGEON TO THE JOHNS HOPKINS HOSPITAL; SURGEON TO THE PRESBYTERIAN EYE AND EAR HOSPITAL, BALTIMORE.

IN the supplement to his interesting and valuable article on penetrating wounds of the eyeball, etc., in these ARCHIVES, October, 1892, Dr. Finlay makes certain criticisms concerning an observation which I have recorded in these ARCHIVES, vol. xxi., No. 3, and concerning my conclusions as to the bacterial origin of sympathetic ophthalmia. To these criticisms I beg to make the following reply.

The observation in question is one which I made with negative result—a bacteriological examination of an eye affected with traumatic irido-cyclitis, removed at a time when the inflammation was still active, and when sympathetic ophthalmia had made its appearance. A portion of the inflamed iris was inserted into the anterior chamber of a rabbit's eye without causing inflammation either of this or of the opposite eye. Dr. Finlay says (p. 495 and 496): "The value of this negative result is somewhat lessened by the following facts: (1) the length of time which had elapsed since the injury, the eyeball being enucleated two and a half months later, it being very possible that the micro-organisms had already been destroyed by their own products, notwithstanding the fact that the process was still active at the time of the enucleation; (2) the limitation of the bacteriological investigation to the iris and aqueous chambers; (3) the

absence of a histological or of a histo-bacteriological examination."

Ad. (1): The possibility that micro-organisms may have been present at an earlier stage of the inflammation and have disappeared at the time of the enucleation cannot, of course, be denied. Against this view it may, however, be urged that pyogenic bacteria have been demonstrated in traumatic inflammations of the eye at a much later period after the injury than in this case, and that the inflammation was still active. As has been shown by Leber and others, inflammations subside with the disappearance or death of the bacteria causing them. Dr. Finlay's objections would have greater force if my observation were an isolated one, but we already possess a considerable number of similar negative bacteriological examinations of eyes removed after the appearance of sympathetic ophthalmia, and it is only cases in which sympathetic ophthalmia has already been produced that can be utilized for determining the question as to the bacterial origin of the disease. The following may be mentioned as having reported negative results from the bacteriological examination of eyes affected with traumatic inflammation removed during the existence of sympathetic ophthalmia: Nordenson, Ayres and Alt, Pflüger, Schmidt-Rimpler, Haab, Sattler, Greeff, Uhthoff, Berry, Kuhnt, and Schirmer.

Ad. (2): Dr. Finlay is mistaken in saying that my bacteriological investigation was limited to the iris and aqueous chambers; as stated in my article, page 368, cultures were also made from the posterior chamber (in the preceding paragraph I had already stated that everything was ready to make cultures from the vitreous and anterior chamber of the eye), and cover-slip preparations from the vitreous and anterior chamber were also examined.

Ad. (3): I regret that I did not include in my article a description of the histological changes which I observed on microscopical sections. I still have the notes of these changes and I became aware of the omission after sending the proof of my article. I take this opportunity to add that microscopical sections showed the customary lesions of trau-

matic irido-cyclitis: hemorrhages in the choroid and retina, dense small-celled infiltration of the uveal tract, especially of the anterior part, with considerable round-cell infiltration of the papilla, which infiltration, however, could not be traced more than a short distance along the stump of the optic nerve. There was beginning organization of the exudate on the surface of the iris and ciliary processes. Sections were stained in the usual way with various aniline dyes, but no bacteria were found.

It is, however, clear from my article that I did not rely exclusively upon cultural methods to determine the presence of bacteria. Cover-slip preparations were smeared with the fresh tissues and exudates, and in my experience such preparations often afford readier demonstration of bacteria in diseased tissues and exudates than do microscopic sections. In addition to cultures and the examination of cover-glass preparations, a test was made by inoculating a rabbit's eye with a good-sized piece of iris. No inflammation developed, which would hardly have been the case had the iris contained living pyogenic bacteria. Dr. Finlay says: "The series of negative results of different observers quoted by Dr. Randolph are of undoubted value, but positive results even if fewer in number have a much greater importance." I am not able to agree with this statement so far as the question of the origin of sympathetic ophthalmia by any bacteria at present described—and especially by the ordinary pyogenic cocci—is concerned, and in this view I am strengthened by Schirmer,[1] who is convinced of the infectious origin of sympathetic ophthalmia and who, after quoting most of the negative results above enumerated, says: "These observations, if made with the necessary care, must naturally have greater weight than the positive results which were obtained by Deutschmann, Limbourg and Levy, Angelucci, Basevi, and Sattler; for if micro-organisms are the cause they must be present in all eyes giving rise to sympathetic ophthalmia.

The occasional demonstration of pyogenic bacteria, in traumatic inflammations of eyes, removed during the exist-

[1] *Von Graefe's Archiv f. Ophthalmologie*, Bd. xxxviii, Abth. 4, p. 234.

ence of sympathetic ophthalmia, has nothing surprising about it, but this demonstration does not warrant the conclusion that the sympathetic inflammation is due to the same bacteria, and in the light of the many negative results does not justify the opinion that these bacteria produce those changes in the injured eye that lead to sympathetic disease. Still less can positive results from injured eyes removed in cases without any sympathetic ophthalmia, and Dr. Finlay's positive bacteriological results were all of this class, outweigh negative results from eyes removed in cases of co-existent sympathetic ophthalmia. Dr. Finlay charges me with failing "to take into account the experiments of Knapp and Leber, on the aseptic or septic condition of wounds and the instruments producing them, and of foreign bodies lodged in the interior of eyeballs, in relation to their liability to produce inflammation and sympathetic ophthalmia." This charge is based upon a misunderstanding as to the purpose of the work which I have published as to the pathogenesis of sympathetic ophthalmia. I have not considered the general question as to the microbic origin of traumatic inflammations of the eye. I have nowhere expressed hostility to the doctrine of the infectious origin of sympathetic ophthalmia as such. I have made a large number of experiments to test the results reported by Deutschmann, and I have not been able to confirm the experimental and bacteriological conclusions reached by him and upon which he bases his argument, nor has any one else been able to satisfactorily confirm Deutschmann's experiments and observations on these points, so that there is now a growing general belief that he fell into serious errors of observation and of interpretation. Schirmer who adduces in his recent exhaustive article every available argument in support of the infectious origin of the disease is forced to the conclusion that this affection is not caused by any known pyogenic bacteria and that it has not been satisfactorily produced experimentally. As my purpose in the article published has been simply to test the experimental and bacteriological evidence brought forward by Deutschmann and others, and not to discuss the general question as

to the infectious theory of sympathetic ophthalmia, I have not found it necessary for this purpose to quote the important experiments of Knapp and Leber.

As my conclusions are in such conformity with those of Schirmer, I may here be permitted to quote the position taken in my article in these ARCHIVES vol. xxi., No. 3, p. 375. "I do not wish to be regarded as absolutely arrayed against the infection theory, but against the theory only so far as the pus organisms are concerned. There are many organisms about which we know nothing, with which it might be possible to produce the disease in animals; and again sympathetic ophthalmia may have its own specific organism. It is possible, too, that the disease is not of bacterial origin, but that an organism of some other class may be present; and again we have strong reason for believing that the lower animals do not have sympathetic ophthalmia, just as they do not have other diseases peculiar to the human race." It will be remembered that it is exactly the ordinary pyogenic staphylococci upon which Deutschmann and his followers lay the chief stress as the infectious agents of the disease, and it is against this view that most of my work has been directed. I am at a loss to understand what Dr. Finlay means by the last sentence of his article: "With regard to the purely theoretical arguments advanced by Dr. Randolph against the staphylococcus pyogenes aureus in particular, they fall to the ground before the positive results quoted, as well as those detailed in this paper." If Dr. Finlay means that I do not suppose that the staphylococcus pyogenes aureus is capable of causing inflammation of the eye, I am certainly the last one against whom such an accusation can be brought in view of the large number of experiments which I have made and published, showing its power in this respect. If he means that I do not consider that there is any satisfactory evidence that this coccus can produce sympathetic ophthalmia, I admit that this is my opinion, but he should not call my arguments "theoretical," as they are based upon observation and experiment, and are confirmed by many others, nor do these arguments fall to the ground before Dr. Finlay's positive results which do not

bring a particle of evidence that the staphylococcus pyogenes aureus can produce sympathetic ophthalmia. Dr. Finlay's own observations are interesting as to the nature of traumatic inflammations of the eye, but they shed no light whatever upon the origin and nature of sympathetic ophthalmia. His observations do not include the bacteriological examination of any eyes removed during the existence of sympathetic ophthalmia. This affection is an exceptional occurrence as the result of injury and traumatic inflammation of an eye, as appears strikingly from Ohlmann's analysis of Schweigger's material, in which out of 556 severe injuries sympathetic ophthalmia occurred only twice. This fact alone would indicate that an infectious agent causing the disease is probably not identical with the ordinary pyogenic cocci found by Dr. Finlay and many others in traumatic inflammations of the eye. To me the surprising thing is that Dr. Finlay should have failed to demonstrate bacteria in so many cases of traumatic inflammations including fresh suppurative forms, rather than that he should have found them in some cases. In the present state of the question as is now generally recognized, the mere demonstration of pyogenic bacteria in a series of traumatic inflammations of the eye without the existence of sympathetic ophthalmia cannot be utilized in discussing the specific cause of the latter disease, and this becomes all the more evident where there are so many negative results as in Dr. Finlay's series.

A NEW SERIES OF TEST-TYPE.

By CHARLES A. OLIVER, M.D.

ONE OF THE ATTENDING SURGEONS TO WILLS' EYE HOSPITAL; ONE OF THE OPHTHALMIC SURGEONS TO THE PRESBYTERIAN HOSPITAL, PHILADELPHIA, ETC.

THE advantages of the test letters reproduced in miniature in the accompanying cut, can be enumerated as follows:

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2. Each row of type has an intentional sequence of letter formation which alternately expresses vertical and horizontal strokes, and curved ones, thus giving a series of characters which serve for the ready detection of astigmatism.

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thereof, thus avoiding any useless mental calculation for the various values.

The preparation of the card has been given to Mr. William S. Yarnall, of 1406 Chestnut Street, Philadelphia of whom copies can be procured.

OPHTHALMIA NODOSA, CAUSED BY PENETRATING CATERPILLAR HAIR.

By Dr. E. KRÜGER, of Bonn.[1]

Translated by Dr. C. Zimmermann, Milwaukee, Wis.

(*With Plate IV., vol. xxiv., Germ. Ed.*)

In the course of two years (1890–1892) at the eye-clinic of Bonn, four cases of a peculiar and rare disease were observed, for which Prof. Saemisch suggested the name *ophthalmia nodosa*. It was characterized by multiple small nodules in conjunctiva, sclera, and iris, caused, as could be proven with certainty, by penetrating caterpillar hair, and associated with violent iridocyclitis and deep corneal infiltrations.

Case 1.—A healthy peasant-girl, aged twenty-three, came on January 6, 1891, stating that her left eye was inflamed since the end of September, 1890, without apparent cause. During that time the inflammation had several times increased with severe pain, abating after about two weeks. The last two weeks she had a more intense relapse. The right eye being perfectly normal, the left shows intense pericorneal injection, moderate photophobia, and is painful in the ciliary region to the touch. The cornea is slightly hazy from a parenchymatous inflammation and in its deepest central layers there is a striated infiltration, 2 *mm* long (in the vertical direction) with indistinct outlines. At the lower margin two smaller ones, superficial, well defined, and vascularized. Two grayish-red cyclitic exudations, of the size of a pin's head, lie in the lower sinus of the anterior chamber. In the

[1] From the University Eye Clinic at Bonn.

hyperæmic and discolored iris are three small yellow-gray nodules at the lower pupillary margin, and below these a similar larger prominence in the region of the minor circle. This portion of the pupillary margin is adherent. On the anterior capsule fine exudations. Vitreous clear. V = $\frac{4}{8}$—. The patient was admitted on the same day, and the irido-cyclitis treated with antiphlogistics (atropine, moist heat, blue ointment). The ciliary injection and corneal opacity increased however. Hardly any reaction to atropine. A fresh exudation formed in the sinus of the anterior chamber. A new, fifth, nodule developed on the iris next to the others, and the pain became unbearable. This, as well as the injection, was at once relieved by Heurteloup's artificial leech (January 11th). On January 18th, ten miliary yellowish-white nodules appeared under the ocular conjunctiva below the cornea, with exacerbating inflammatory symptoms. They were oval, roundish, 1-1.50 *mm* long, prominent, arranged in three groups of 3 or 4, looking white under the injected conjunctiva, in part (4) adherent to the sclera, in part (6) movable with the conjunctiva. After three days two more sprung from the upper medial corneal limbus. They grew a little larger, but not exceeding 2 *mm* in length. The nature of these nodules remained unexplained at first, since their tough consistence, their location, and the absence of other symptoms were against a tuberculous eruption. January 23d, two subconjunctival and one scleral nodule were removed, hardened in alcohol, stained with hæmatoxylin, and mounted in celloidin. In sections they showed a great resemblance to tubercles, consisting mostly of an accumulation of round cells, interspersed with non-vascular, scanty connective tissue, and surrounded by connective tissue infiltrated with a few cells, without a special capsule. In the centre of the nodule were several giant-cells with numerous large, not marginal nuclei, few epithelioid cells, and between them a yellow foreign body with two oval sections, a central cavity, and a yellowish cortical substance, corresponding, on the whole, to the oblique section of a hair. As the latter could, in all probability, be only a caterpillar hair, the patient was questioned in that respect. Finally she remembered that, on the 26th of September, when she first noticed the pain in her eye, her sister had thrown a black-brown caterpillar, in a rolled up state, against her left eye, while she was busy with hay-making on a meadow in the woods. She did not pay any attention to it, but rubbing caused slight pain, which became

more severe towards evening. The next day the left eye was very much inflamed.

According to the description, season, and locality, it could be only a caterpillar of the species *gastropacha rubi*, very common in autumn on meadows in the woods. We know that their hairs, when penetrating the epidermis, cause itching, erythema, and urticaria. A specimen, accidently on hand, was identified by the patient as the same by which she had been injured. This caterpillar, which, from August to April, may be found on various low plants, attains a length of 7–9 *cm*, is black, and has tufts of long dark-brown hair, and on its back a band of short tough rust-colored hair with black transverse indentations. Under the microscope the hairs appear light-yellow and have a central lumen, one third of their diameter wide, ending in a sharp, short point. They are covered by scales, arranged in the form of shingles, terminating in hooks which are turned towards the root of the hair. These hooks, preventing any backward movements of the hair, when it has once penetrated the skin, are wanting in the darker ones, which have larger lumina and exceedingly thin and long points. The hairs found in the nodules were identical with the short, light hair in color, size (0 03–0.04 *mm* wide), and shape, and in most sections their margin appeared to be eroded. Possibly the scales had fallen out of these irregular roundish indentations in consequence of the preparation, as similar changes were found in sections of these hairs which had been prepared differently.

In regard to the further course, this case showed very frequent acute relapses. In intervals of four to twenty days, in which the eye was almost without irritation, generally at night an exacerbation of the inflammatory symptoms set in, under intense pain, lasting for a while. No other immediate cause could be ascertained, but several times a protracted examination or clinical demonstration. During these attacks, the cloudiness of cornea and aqueous humor increased, and the nodules swelled somewhat. The striated corneal infiltration advanced upwards nearly to the upper limbus in a few weeks. Then it divided into several portions, in one of which a thin yellow thread became visible deep in the substance, which undoubtedly was a penetrating hair. In these attacks Heurteloup's leech was very efficacious (except once), the inflammatory signs abating promptly on the second day. After six months the relapses became less frequent, the nodules grew flatter and smaller and more yellow and transparent. From

time to time however a very painful inflammation of longer duration occurred, the last May 9th. On this Heurteloup's leech had no effect (May 17th), but after six natural leeches (May 25th) the inflammation subsided in a few hours. The left eye has remained free from irritation ever since. The conjunctival and scleral nodules in part disappeared entirely in the three subsequent months, in part left some small yellow or gray spots (the latter near the limbus). The striated infiltrations of the otherwise clear cornea were transformed into maculæ. The yellow hair in one of them could not be seen any more. Only one of the nodules in the iris is still marked. Synechiæ unchanged. Pupillary exudations thinner. The media being clearer now, opacities of the vitreous and an oval atrophic focus, lined with pigment, can be discerned in the choroid downwards and outwards near the ciliary body. The affection, taking a relatively favorable course under simple antiphlogistic treatment, may thus be considered as permanently cured.

Case 2.—A man of twenty-six years, presented a similar picture, suffering from a painful inflammation of the left eye since September 14, 1891. On the previous day he worked in a field of oats and in the afternoon, while resting on straw in a barn for some time, he had the sensation as if some straw had entered his left eye. The next day the eye was very much inflamed. At the first examination (Nov. 5th), seven weeks afterwards, a violent iridocyclitis was discovered with intense ciliary injection, discoloration of iris, synechiæ, and cyclitic exudations in the sinus of anterior chamber. Besides, the iris exhibited some fine reddish-yellow spots and striæ near the ciliary border. $V = \frac{20}{40}$ —. The patient was admitted Nov. 5th, and treated in the same manner as the first, but without result. But after the application of six leeches (Nov. 10th), the inflammation gradually subsided. During that time (Oct. 21st), a pupillary exudation formed, and Dec. 1st thirteen nodules were observed under the ocular conjunctiva, perfectly similar to those described above. Except two, they were located between cornea and the lower fornix, nine on the sclera, four in the conjunctival tissue. Although tuberculosis could not very well be assumed in this case either, 1 *mgrm* tuberculin was injected on Dec. 4th, but without reaction. Jan. 16th the patient, being a little better, was dismissed upon his request. Four weeks later (Feb. 17th) he was again admitted. In the meantime the inflammation had become severe several times. The condition was

about the same as when he left. The nodules, persisting in the same number, apparently had become smaller. In the cornea a deep exudation in form of a vertical stripe, which was approached by some blood-vessels from the margin. In its centre a fine brownish-yellow thread could be perceived. The fine spots in the iris were more prominent and had a more gray color, the synechiæ more numerous, and the exudation on the anterior capsule denser. As hairs were found in the nodules of the first case, the same cause was supposed to exist in this one, and was verified by the examination of three nodules, excised on Feb. 23d. The patient only remembered that he had seen many large brown caterpillars at that time, but did not know whether one had come in contact with his left eye.

Plate IV. (1:100) shows such a preparation made by Dr. Caspar. It represents, in subconjunctival tissue, a nodule without capsule, consisting of round cells. In the centre it contains, between four giant-cells, a yellow ring, the cross-section of the hair with a central lumen, a yellow cortex, and roundish indentations at the margin. From the above reasons, it can hardly be doubted that it is a hair of *gastropacha rubi*.

Case 3.—Jacob Esser, a boy of five years, was seen Feb. 21st, 1892. The left eye was perfectly normal. Right eye: severe iridocyclitis with intense ciliary injection, exceedingly narrow pupil, and almost complete seclusion and occlusion, as observed after perforating injuries. The diagnosis was determined by numerous nodules under the conjunctiva and in the iris. Twelve nodules, $\frac{1}{2}$ *mm* long, were found between corneal limbus and lower fornix, located partly in Tenon's capsule, partly in the uppermost layers of the sclera (3), three under the conjunctiva of the lower lid, of which two were seated so deep that they became perceptible through the external skin when the lid was slightly stretched. From the minor circle of the iris three folds, like pockets, ran downwards, in the bottom of which, near the sinus, four oval nodules were situated, seemingly 2 *mm* long, with smooth surface and of the same color as the iris. The iris-periphery was slightly bulged forward. No red reflex. V = $\frac{3}{60}$. Tension minus. The parents noticed the inflammation since Oct., 1891, which did not seem to be painful, but they could not state anything in regard to the cause. The microscopical examination of two episcleral nodules showed the same picture described above. This case ended unfavorably. Atropine remaining ineffectual,

as might be expected on account of the occlusion of pupil, iridectomy was performed March 4, 1892. A narrow, but complete coloboma downwards was obtained and the largest nodule removed with the iris. Healing without disturbance. The injection decreased, and V = $\frac{10}{200}$. But after fourteen days the injection increased, the pupil became smaller and covered by exudation, iris bulged forward. After four weeks, detachment of retina. Decrease of tension, V = $\frac{1}{200}$, so that the eye could be considered as lost. The excised piece of iris was filled with lymphoid cells and irregular exuberant pigment-cells. No fragments of a hair could be found. Probably the portion of the nodule containing the hair remained in the eye.

Case 4.—Gabriel Fink, æt. thirteen, was observed March 12, 1892. Since September, 1889, he suffered from a constantly recurring, moderately painful inflammation of his right eye, without known cause. At the end of 1889 he had been treated in this city as an outdoor patient for keratitis superf. vasc. and iritis serosa, with doubtful diagnosis, for a few weeks. At the first examination (March 12, 1892) a roundish macula (2 *mm* in diameter) was observed at the upper external limbus, with slight pericorneal injection, spongy exudation at the lower sinus, and a peculiar affection of the iris. It was a dark, almost horizontal, furrow, 7 *mm* long, 1.50 *mm* wide above the minor circle, commencing in the middle of upper and outer quadrant of the iris, and terminating at the nasal angle of the anterior chamber with a yellowish-gray nodule 2 *mm* long, in connection with a white thread. Pupillary exudation, numerous synechiæ, on one of which a nodule was seen. V = $\frac{20}{200}$. Fundus visible, optic disc hyperæmic. A diagnosis was not arrived at until, at the second examination, 16 minute yellow-gray nodules, hardly prominent, were detected, which required great attention and good daylight. The nodules, 1 *mm* long, were partly movable. The assumption that they also were caused by caterpillar hair was confirmed by the patient, who remembered that, while haying, his brother had thrown a dark-brown caterpillar against his right eye, which became inflamed immediately afterwards. In this case the nodules were enclosed in a thick capsule of connective tissue, probably from their long duration. The round cells were partly decaying; no giant-cells. Fragments of light yellow-brown hair, probably of *bombyx rubi*, the description and the time of its first appearance (September to October) being in favor of this suppo-

sition. The loupe revealed such a fine brown hair in the cornea, 1.5 *mm* long, parallel to its surface. There was no indication for the removal of the nodules in the iris, so that they could not be examined, but they undoubtedly were of the same nature as the subconjunctival. The eye healed under atropine, although three weeks after admission a slight injection with haziness of cornea recurred for a few days. V = $\frac{8}{200}$. The two first cases remained entirely without relapse.

Literature contains three similar cases.

The *first* was communicated by H. Pagenstecher at the fifteenth meeting of the German Ophth. Society at Heidelberg in 1883 (*Transactions*, 1883, p. 176). A caterpillar had entered the right eye of a child while playing. After rubbing the eye, burning and inflammation set in, which disappeared soon, but returned after about five months. Four weeks later Pagenstecher found the ocular conjunctiva sprinkled with miliary, tough, and movable nodules. Pupil oval; at the lower pupillary margin small gray nodules. He thought it was a tubercular eruption, and contemplated enucleation of the globe. But the microscopical examination of a conjunctival nodule revealed a hair in its centre. Its structure was the same as that of a tubercle. The same was found in the excised piece of the iris. Excision was followed by permanent recovery. The remaining nodules in conjunctiva and iris were gradually absorbed. The species of caterpillar could not be defined.

In the *second* case, observed by Weiss (*Arch. f. Aug.*, 1889, xx., p. 341), the nodules were wanting in the conjunctiva. The patient was a laborer, into whose left eye a caterpillar (*gastropacha pini*) had fallen, while he was engaged in collecting them, six months ago. The eye showed iritis with formation of nodules, numerous synechiæ (almost seclusion of pupil), and fine hairs, free in the iris and cornea. V = fingers near by. Antiphlogistics being without effect, four weeks later a piece of iris with nodules and hairs was excised. Three days after the operation an exacerbation occurred, but subsided after three weeks. V = $\frac{6}{36}$. The nodules had the structure of a tubercle with yellowish hairs,

with irregular outlines in the centre. This caterpillar was abundant in the Palatinate in 1885 and 1886. The long brown hair showed microscopically a cellular integument, turned towards the point, *i. e.*, unfavorable for penetrating the skin; in the short, partly bluish hair of the back the opposite arrangement took place. The sections showed the first kind. Weiss calls attention to the investigations of Leydig and Karsten, who found that the lumina of the hair of *gastropacha rubi* and other saturnia species communicate with glands, so that the intense action of their hairs on the skin is a *chemical* one.

Wagenmann (*v. Graefe's Arch.*, 1890, xxxvi., 1, p. 126) published the third case. The previous history of a boy of nine years was that, in October, four months before the first examination, a long brown caterpillar was thrown into his eye, followed by a slight inflammation on the same day. V. diminished; 2-3 flat yellowish prominences on the nasal portion of ocular conjunctiva, caused by thickening of the subconjunctival tissue, with intense ciliary injection. On the limbus some small gray spots. Pupil irregular. Below the lower pupillary margin were two small-pointed prominences, with retraction of the tissue between. In the excised nodule tubercular elements with vascularized connective tissue at the margin were found, and in the centre a yellowish hollow hair with eroded outlines. The hair lay in the longitudinal axis of the nodule. Weiss thinks that it came from *gastropacha pini.* The iritis healed after one month without relapse, and apparently without impairment of sight. According to Weiss' and my observations the giant-cells were more numerous in the nodules with hair, and their nuclei central, not marginal, thus differing from tubercles.

Weiss mentions an endemic of external ophthalmia, observed at Eisleben, eleven years previously, caused by *cnethocampa pinivora*, frequent at that time. Such cases of conjunctivitis were often seen, most of which were caused by caterpillars. Baas (*Klin. Mon.*, 1888, p. 65) communicated two cases of an acute painful conjunctivitis with photophobia, probably produced by *cnethocampa processionea.* They healed in one or two weeks.

Fortunately, the protracted affections with formation of nodules, described above, are rare. The *chief danger* rests in the *iritic complication.* The structures of the hair, chiefly the little hooks, enable it to penetrate so far into the membranes of the globe, especially if favored by rubbing the eye. If we remember how often indifferent foreign bodies, lodged in the iris, start inflammatory relapses, it will be readily conceived that the hair, charged with cauterizing substances, and apt to change its position, may bring about circumscribed accumulations of round cells and produce giant-cells, and further on, violent and frequent reactions in the iris and cilary body, as described. In all cases the changes were found in the lower portion of the eyeball, the one mostly exposed to injuries while in the palpebral fissure, when the eye instinctively rolls upwards.

In order to decide the question by *experiment*, whether the hairs of bombyx rubi can penetrate the cornea and produce such inflammations, I pressed two such caterpillars on the eyeball of two rabbits. The result was, that numerous fragments of hairs could be detected in the different layers of the cornea. On the same day a dense haziness of the cornea set in, turning into a diffuse parenchymatous cloudiness within a few days, with formation of large and small vesicles and profuse secretion. The infiltration healed after a few months, leaving an extensive macula. No nodules in iris or conjunctiva, the hair probably not penetrating the cornea or sclera as far as to reach the iris. The cornea of one animal, which died after three months, showed under the microscope flat and diffuse infiltrations, and numerous pieces of caterpillar hair in its different layers, even in Descemet's membrane, thus proving that the pointed hairs are able to pierce the cornea and eventually invade the iris.

The diagnosis will not be difficult, if conjunctival nodules or free hairs are present, as such multiple tough nodules, persisting very long without decay, do not occur in general affections, nor in connection with other foreign bodies. In such cases, however, in which the iris alone shows nodules, the diagnosis is only possible after excision of that piece of

iris, bearing the nodules, as their aspect and situation have nothing characteristic.

The *rare occurrence* of the disease may be explained by the fact that the invasion of the eye by a caterpillar is rare, and that even then it requires some force (throwing, rubbing, etc.) to drive the hairs into the sclera or iris through the cornea. On the other hand, we may suppose that this affection is not as rare in other regions, where *bombyx pini* and *cnethocampa processionea* are frequent, but that it may not be recognized. This may happen very easily on account of the mostly insufficient previous history, and because the characteristic subconjunctival nodules, which, even when persisting several years have no tendency to ulcerate, may be overlooked, especially after long standing. Besides, the nodules in conjunctiva and iris might be mistaken for tubercles with giant and epithelioid cells, of course without bacilli, if not all microscopical sections are carefully scrutinized. Only in a very small percentage of these, especially when cut obliquely, fragments of hairs are found, as they may fall out easily. Perhaps Leber and Haensell's "benign iris-tuberculosis" (*Klin. Mon. f. Aug.*, 29; supplement *Transactions* Germ. Ophth. Soc. at Heidelberg, p. 44) is the same affection.

The *prognosis* must be guarded, on account of the complicating iridocyclitis, which may lead to occlusion and seclusion of the pupil and further destructions.

Although *iridectomy* in the third case was without effect, and the three others healed in ¾ to 2 years with atropine, mercurial ointment, and blood-letting, besides these, iridectomy in the earliest stages is mostly to be recommended, when nodules are present in the iris, provided that they can be removed with the piece of iris. In Pagenstecher's and in Weiss' case the operation was followed by lasting recovery. The treatment may be shortened by excision of the subconjunctival nodules, which chiefly create the inflammatory symptoms and pain.

ON THE PATHOLOGY AND PATHOGENESIS OF RETINITIS PROLIFERANS (MANZ).[1]

BY DR. M. BANHOLZER.

Translated by Dr. WARD A. HOLDEN.

(*With Plate V. of vol. xxv., Germ. Edit.*)

B. M., a woman of thirty-nine, was received into the clinic October 3, 1890, with the following history:

Six days previously the patient had struck against the tongue of a wagon in the dark, injuring her left eye. There was severe pain for two days and the sight was lost. *St. pr.* Left eye shows chemosis and ecchymoses of the conjunctiva below; a conjunctival rupture on the nasal side; cornea transversely elliptical, folded, opaque in its inferior half. The anterior chamber containing blood. Interior of the eye dark; —T1. Perception and projection of light good.

Ten days later the blood in the anterior chamber had absorbed and an extensive iridodialysis was found on the nasal side. No red reflex from fundus. The eye gradually cleared up, and a pigmented scleral rupture could be clearly seen. Many flocculent masses in the vitreous.

February 3, 1891, four months after the injury, the eye became very painful, for which no cause could be found. The eye is free from irritation, and not sensitive to pressure. The scar is somewhat ectatic. The fundus is indistinctly seen. About the disc there is a light ring of connective tissue. No detachment of the retina can be discovered. The pain continued. Tn. Patient counts fingers.

May 25th, the pain becoming unbearable the eye was enucleated.

[1] From the University Eye Clinic in Zurich.

At that time the eye was free from irritation and showed a scleral scar 1 *cm* long at the nasal margin of the cornea and concentric with it, and a coloboma of the iris on the nasal side, the pupil and coloboma being filled by a transparent membrane with opaque stripes and points. The vitreous contains opacities. The margins of the disc are blurred (Fig. 1). The disc is surrounded by a light ring, from which two slightly diverging white strands pass downward nearly to the equator of the eye. The retinal vessels run beneath these light projecting bands, except just beneath the disc, where one large vessel bends in a sharp curve over the band. No new-formed vessels are seen. The finer details of the fundus are masked by the opacities in the vitreous.

The enucleated ball was placed first in a saturated bichloride solution and then in alcohol. After hardening for three weeks it was divided by a horizontal section (Fig. 2).

The pupil and the coloboma are separated from the anterior chamber by a membrane arising from the ciliary body on the temporal side and ending in the scleral scar on the nasal side. The lens is wanting. Behind the iris and the pupillary membrane there is a fairly clear layer of vitreous about 5 *mm* thick. Continuous with this posteriorly is a yellowish-white opaque mass, which in its posterior portion is torn and folded, and is conneeted by a few fine fibres with the bands in the retina. The retina, with the exception of a small portion of the pars ciliaris rests in position on the choroid.

The disc is surrounded by wall-like elevations, 1.5 *mm* high on the temporal side, and 1 *mm* high on the nasal, having a smooth surface and a white color, passing gradually over into the retina laterally.

Beneath the disc is a nodule over which runs a retinal vessel, as was seen with the ophthalmoscope. From this nodule a white band 1 *mm* thick runs inferiorly. At its lower end this band spreads out like a fan, and thick striæ from its lateral margins are inserted into the retina. From the temporal side of the disc, a white band 0.5 *mm* in thickness passes downward and outward. Laterally it is accompanied by a flat white elevation. Inferiorly it broadens out and ends with fine fibres in the retina. Between the lower portion of this band and the elevation, a delicate membrane stretches through the vitreous. The elevation on the nasal side is irregular and furrowed.

The portion of the elevated wall above the disc passes over

gradually into the level of the retina, and only a single band can be followed to the equator.

The retina in nearly its entire extent shows a light gray color from the hardening process. In the inner lower segment there is a dark patch, 4 *mm* in diameter, somewhat excavated, and sharply limited from the remainder of the retina.

The light tracts seen with the ophthalmoscope correspond to the apex of the higher elevated portions, while the flatter elevations were not seen with the ophthalmoscope on account of the cloudiness of the vitreous. While the macroscopic appearance indicated a retinitis proliferans, the ophthalmoscopic picture suggested Nagel's retinitis striata. The microscopic examination was of particular interest, since the former affection had been examined in but one case, and then at a late stage, while no case of the latter had been examined.

From the projecting portions of the retina numerous lamellæ run out into the cyclitic membrane, indicating traction from the side of the vitreous.

Between the limitans interna and the layer of ganglion cells are a quantity of new cells, particularly near the vessels.

The bulk of the retina shows no very marked pathological changes. In the elevated portions the particular change is an excessive proliferation of the inner portion of the supporting fibres, and a splitting up of their inner ends. Where the limitans interna is preserved, there is a wide interspace between it and the inner reticular layer through which the nerve-fibres run. In other portions there are dense connective-tissue tracts running longitudinally. These tracts are composed in part of elongated supporting fibres which have lost their radiar direction, and in part of connective-tissue fibres.

Nearer the apex of the elevations this layer becomes broader and looser, and is evidently the product of excessive connective-tissue hyperplasia and hypertrophy. In some places there is a limitans interna, in others the fibres end toward the vitreous in a network.

Near the disc the retina is thrown into several sharp, narrow folds.

The cause of the affection was the severe trauma with vitreous and retinal hemorrhages. Six months after the injury the ophthalmoscope showed a light, prominent ring about the disc, with a number of elevated processes running from it.

The changes were due, as the microscope showed, first, to a growth on the inner surface of the retina, consisting of proliferated supporting fibres and new-formed connective tissue; second, to a tissue resting on the limitans interna; and, third, to sharp, narrow folds in the retina itself.

The tissue lying on the inner surface of the limitans interna undoubtedly developed from a vitreous hemorrhage near the retina. The folding of the retina and the broadening of some of the layers may be considered to be due to traction from the shrinking tissue.

The question whether we have here a case of retinitis proliferans (Manz), or of retinitis striata, must now be answered in favor of the former affection. The light striæ observed in the latter affection, according to previous observations, never attain the breadth of those seen in our case. In retinitis striata the striations lie constantly beneath the vessels, in the deep layers of the retina, and usually show pigmentation. Nagel has therefore designated the affection as chorio-retinitis.

In the present case, as well as in most of the cases of retinitis proliferans that have been described, the retinal vessels lay for the most part beneath the white masses and tracts. The deeper layers of the retina and the choroid showed very slight microscopic changes. The case, therefore, cannot be considered one of retinitis striata until the microscopic examination of a case of retinitis striata shall show changes similar to those found here.

The scanty literature of the subject begins with Manz[1], although before this Jaeger[2] had given a drawing and clinical history of a case in his atlas. After a long observation of three similar cases, Manz described them as exhibiting a distinct disease, which he called retinitis proliferans. He

[1] *Graefe's Archiv*, vol. xxii., iii., 229.
[2] *Beiträge zur Path. des Auges*, 1st edit., plate lv.

supposed the retina to be principally affected, and later anatomical examination has verified his views. Leber and Michel have also described the disease. The older cases were spoken of by Manz.[1] New cases have been reported by Strawbridge,[2] Schleich,[3] Pröbsting.[4]

The first anatomical examination was made by Manz in an eye which had been a long time under observation. The condition found, however, at first glance presented little similarity to the case described here. Manz's eye showed hypotony, anterior synechiæ, atrophy of the iris, cataract, and total detachment of the retina.

Our case showed none of these changes. Microscopically the two cases were similar, inasmuch as in both the new-formed tissue resting on the retina consisted of proliferated Müller's fibres and new-formed connective tissue and vessels.

The changes in the pigment epithelium that Manz found are wanting here, and the condition of the limitans interna in our case is different. Manz does not speak of a tissue deposited on the inner surface of the limitans.

Manz was in doubt as to the cause of the detachment of the retina. In my opinion this was caused by the traction of the shrinking new-formed tissue.

The drawing of a frontal section of the posterior segment of the eye in Manz's[5] paper seems to indicate such traction. The portion of the retina which supports the new-formed tissue in the vitreous is folded in a way unlike that seen in the other portions of the retina. In the former positions there are numerous sharp folds the direction of which shows them to be caused by traction from the side of the vitreous.

It may reasonably be assumed that in most cases of retinitis proliferans showing tracts and elevations, such secondary retinal folds are concealed beneath them. This explains the fact that larger retinal vessels run above such tracts.

[1] Becker, *Bericht über die Wiener Augenklinik*, 1867, p. 106. Hirschberg, *Klin. Beobachtungen aus der Augenheilanstalt*, Wien, 1874, p. 64. Schnabel, *Knapp's Archiv.*, v., i., p. 124.
[2] *Trans. Amer. Ophth. Soc.*, vol. ii., p. 304.
[3] *Klin. Monatsbl. f. A.*, vol. xxviii., p. 63.
[4] *Ibid.*
[5] *Graefe's Archiv*, xxvi., ii., p. 55.

The drawings of Manz, Schleich, and Pröbsting show the retinal vessels in these circumstances convex forward as we are accustomed to see them in detachment.

Many capillaries were found extending out in the proliferated tissue, but I believe that many of the large vessels seen in their cases owe their visibility to the detachment of the retina, and are not new-formed vessels, as we find many vessels in the gray retina after embolism or detachment, that had not been previously visible.

Another question of importance is the rôle that the vitreous plays in these cases. Whether the retinal proliferation is primary and the involvement of the vitreous secondary, cannot be definitely decided. We find, however, parts with excessive proliferation of the supporting tissue without deposits on the side of the vitreous.

Whether the detachment of the limitans interna favors the proliferation of the supporting fibres is doubtful, since the proliferation is found where the limitans interna is normal.

The etiology of retinitis proliferans should now be considered. Manz in his first publication said: "Intraocular hemorrhage which occurred in the course of the disease in my patients, stands doubtless in intimate causal relation with the proliferation." We may say further that in most of the cases published there has been intraocular hemorrhage, either in the vitreous or in the retina, occurring once or repeatedly.

As regards clinical course and prognosis, I have nothing to add to the clinical experience of the authors cited.

The fairly good vision which is sometimes found even late in the disease, finds its explanation in the fact that the nervous elements, particularly the rods and cones, are relatively intact. A final phthisis is however not rare.

Although my studies do not throw light on all the questionable points in regard to this affection, the case nevertheless explains in some degree the development of a disease which has hitherto been studied only at an advanced stage. The case shows particularly that the histological changes are in quality similar to the changes found in other ocular

affections; but that in extent and in localization the changes are so characteristic that we must consider them as constituting a distinct disease.

Since the microscopic examination shows a proliferation of the supporting tissue of the retina to be the fundamental change, the name retinitis proliferans is pathologically correct.

In conclusion I wish to express my thanks to Prof. Haab for kindly furnishing me the material, and for granting me the use of the laboratory of the University eye-clinic in making these investigations.

DESCRIPTION OF THE FIGURES.

Fig. 1. Ophthalmoscopic sketch—inverted image.

Fig. 2. Inferior half of the ball.

Fig. 3. Transverse section of the retinal cord which extended upward. Beside it, normal retina.

A CONTRIBUTION TO THE ETIOLOGY OF THE SO-CALLED RETINITIS PROLIFERANS.

By Dr. S. SCHULTZE, Frankfort-on-the-Main.

Translated by Dr. Ward A. Holden.

(*With two figures in the text.*)

THE rare affection which Manz (*Graefe's Arch.*, xxii., 3) has called retinitis proliferans is not yet fully understood in its etiology and pathology.

Many oculists see such cases, but as they are rarely kept long under observation, and as no case has been examined anatomically,[1] not many have been reported.

The two cases to be described here are of interest, since they were under observation for many years and therefore throw some light on the etiology and genesis of the affection.

The first case was seen in 1870 by Dr. Göpel, who has given me the following notes of the condition at that time.

"C. S. æt. twenty-nine, a previously healthy laborer, complained of poor vision three weeks after an attack of fever, probably intermittent. *St. pr.:* General weakness, with rapid pulse. Heart normal. L V $\frac{8}{200}$, R V $\frac{6}{200}$. L vitreous shows diffuse and floating opacities. The retina, particularly near the papilla, shows grayish-green masses of exudation arranged in stripes. R vitreous cloudy near the disc. Disc red and blurred. A diagnosis of optic neuritis, with deposition of exudation upon the retina, was made. Under treatment with mercury and iodide of potassium the vision improved somewhat.

In 1890 the same patient consulted me on account of a trau-

[1] See preceding paper.—H. K.

matic conjunctivitis. He had always been well with the exception of the one attack of fever. No history of syphilis ; thoracic and abdominal organs normal. Urine contains neither sugar, albumen, nor oxalic acid. L V $= \frac{1}{12}$, central scotoma; R V $= \frac{6}{6}$, limits of field normal, blind spot larger than normal. The

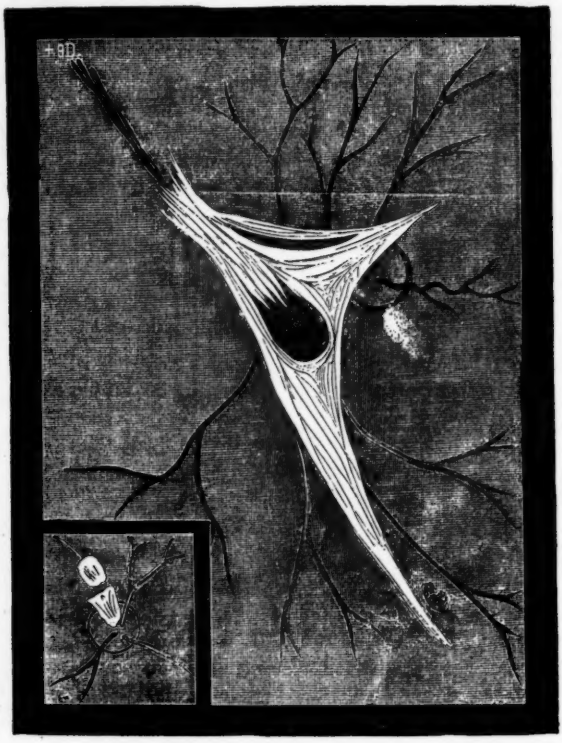


FIG. 1.

anterior segment of the eyes is normal. With the ophthalmoscope the right vitreous contains many floating black opacities. The nasal half of the disc only can be seen. It is yellowish-red in color, and from it runs a large tortuous vein. The temporal half of the disc is concealed by a membranous deposit, which spreads out over the neighboring retina in a triangular form

(Fig. 1). These strands have an elevation of 6 D. The superior one ends by dividing into fibres which run out into the normal retina. The others end in a sharp point.

This membranous deposit is composed of interlacing bundles of a varying height. No vessels are seen on the new formations and the retinal vessels run beneath them. At the termination of the superior strand, a number of small dark vessels run out free into the vitreous and end in loops which are seen with + 9 D. Near the ends of the inferior strand is a pigmented patch, but nowhere else in the fundus is there pathological pigmentation, and no hemorrhages are seen.

The left eye, with poorer vision, shows a few floating opacities of the vitreous. The disc is pale and the retinal arteries are small. There are two patches of deposit in the retina (Fig. 1, left-hand corner). A year later the condition was unchanged.

FIG. 2.

The second case was seen in May, 1889. A. B., æt. twenty-five, was healthy and had no organic disease. A year before vision became poor in the left eye and later in the right. Recently there has been a second sudden failure of sight. Ophthalmoscopically, the vitreous is diffusely cloudy, fundus not seen. R V = $\frac{1}{12}$, L V = $\frac{1}{12}$. The red corpuscles of the blood were normal in number, the white increased in number, and showing degenerated forms. The spleen and lymphatic glands were normal, however, and the patient had not a leukæmic appearance. In the following eighteen months there were several relapses, the patient being treated with iodide of potassium and iron.

Nov. 19, 1891 R V = $\frac{1}{100}$; L V = $\frac{6}{25}$. R vitreous shows floating opacities. The disc is concealed by a membrane (Fig. 2)

which has an opening in its centre and sends a number of processes out into the retina. The retinal vessels run beneath the membrane. Near the outer margin of the membrane, there are two small apparently fresh hemorrhages. The surface of the membrane is fairly smooth, not being composed of bundles as in Case 1. The remainder of the retina is normal.

In the left eye the disc is red and the retinal veins are large and tortuous. In the periphery of the visible fundus there is a bluish-white deposit on the retina, about two disc-diameters in extent, with a striated surface without vessels. Two months later the ophthalmoscopic picture was unchanged.

The genesis of the first case is not clear, as retinal or vitreous hemorrhages were not observed, but from the history it is probable that hemorrhages had occurred.

The ophthalmoscopic picture corresponds to that described by other observers, except that new-formed vessels in the vitreous had not previously been found in this disease, although such vessels are seen in cases of hemorrhagic retinitis. The fact that the vision in the eye was $\frac{5}{6}$, speaks against a primary diffuse retinitis, as Manz assumes. Such an inflammation of the retina would hardly pass off leaving vision so good. The other eye with less change in the retina is blind, but the blindness is due to a post-neuritic atrophy of the optic nerve.

The second case was more closely followed. A man of twenty-five has repeated spontaneous hemorrhages into the vitreous over a period of two years. The membranous deposit on the retina is without doubt the result of the vitreous and retinal hemorrhages.

The literature of the subject is scanty. Jäger first described and pictured a typical case in his atlas, calling it a new formation in the vitreous. O. Becker and Hirschberg each described a case.

Manz (*Graefe's Arch.*, vol. xxii., 3, and vol. xxvii., 3) observed three identical cases and later examined one of them anatomically. This case, some years before the enucleation, showed the typical picture of retinitis proliferans, and the eye had finally become phthisical. In the shrunken ball with total detachment of the retina, Manz found a chronic

retinitis with new formation of tissue on the inner surface of the retina, and therefore called the disease retinitis proliferans, since he regarded the inflammation of the retina as the primary change. But as the eye showed total detachment of the retina and other chronic inflammatory products, it is questionable in how far the changes found in the retina were related to the membranous deposit or to the inflammation leading to the phthisis. All of Manz's cases had vitreous hemorrhages.

Leber (*Graefe-Saemisch*) describes this affection in detail and reports several cases that he had observed. He thought the disease to be due probably to recurrent hemorrhages in the retina and vitreous, as these were always found if the case was kept under observation for a sufficient length of time. In one case the urine showed oxalates, and Leber thought that possibly oxaluria might lie at the bottom of some cases, as Mackenzie had also found it once. This supposition however has not been verified.

Alexander (*Deutsche med. Wochenschr.*, 1884, No. 40) in a healthy man, æt. twenty, with vitreous opacities, found a broad connective-tissue fold above the disc, projecting out from the retina. The retina also showed hemorrhages, and Alexander thought the vitreous opacities and the connective-tissue fold to be the result of hemorrhage.

Schleich (*Klin. Monatsbl. für Augenheilk.*) followed two cases for a considerable time and saw membranous deposits developed from previous retinal and vitreous hemorrhages. The correctness of Leber's supposition was thus proved.

Pröbsting (*Klin. Monatsbl. f. Augenheilk.*) reported a case that was complicated with retinitis albuminurica. It showed vitreous opacities, retinal hemorrhages, and the typical picture of retinitis proliferans. The proliferation of the connective-tissue elements of the retina, which he found after experimental hemorrhage into the vitreous, is of interest, and may be considered the analogue of the retinitis that Manz assumes. On the other hand, the connective-tissue proliferation may come on without inflammation, and remain localized, for which reason Leber hesitates to adopt the name " retinitis proliferans."

Martinet (*Deutsche med. Wochenschr.*, 1891, No. 9) described a case complicated with nephritis and diabetes.

In all these cases there were vitreous and retinal hemorrhages, or remains of them, and to these may be attributed the chief rôle in the development of the affection.

The ophthalmoscopic picture of retinitis proliferans corresponds almost exactly to that which we find at times after injury to the ball, where there are the glistening white elevated non-vascular deposits on the retina. In one of these eyes Waldeyer found a chronic chorio-retinitis with a plastic exudation on the inner surface of the retina, moderate fibrous degeneration of the retina, and atrophy of the choroid. The plastic exudation and the degenerated retina beneath it consisted of thick bundles of connective tissue running for the most part in a radiar direction but also interlacing to some extent. The new-formed deposit contained few cells and was not like ordinary young connective tissue. This tissue was in connection with the flocculent masses in the vitreous and was similar to them in structure.

I believe that here and in retinitis proliferans the new masses are not inflammatory and exudative, but rather deposits of unabsorbed blood fibrin. The deposits are in intimate connection with the retina and cause atrophy of the nervous elements of the retina and hypertrophy of the connective-tissue elements, and finally become themselves transformed into finely fibrous cicatricial tissue

Leber (*Graefe-Saemisch*) says: "After injury of the eye causing hemorrhages into the vitreous and into the coats, at times dense partially pigmented connective-tissue membranes remain, lying partly on the inner surface of the retina and partly in the retinal stroma and even in the choroid. . . . In shot wounds when the eye has not been injured directly, we may after a time find hemorrhages in the vitreous, after the resorption of which we find marked changes in the fundus, in the form of glistening white connective-tissue membranes with remains of blood and black pigment. The white patches lie in front of the retinal vessels and often project above the level of the retina. Probably there have been here blood coagula which were

not absorbed, but have become transformed into connective tissue, while some of the coloring matter becomes dark pigment."

This description does not correspond to my idea of retinitis proliferans. Since in every case vitreous hemorrhages are found at some period, it is probable that we have to do here with an imperfect resorption of blood coagula which become adherent to the retina, and finally lead to a proliferation of the connective-tissue framework of the retina. The transformation of these coagulated masses into true connective tissue seems to me to be very questionable.

In conclusion I would repeat that the name retinitis proliferans is unsuitable for this affection, since an inflammation of the retina has never been observed as the primary disease, while retinal and vitreous hemorrhages are always found; the remains of these form finally the white deposits on the retina, which in my opinion are nothing more than unabsorbed masses of fibrin precipitated on the retina, that in the course of time assume the appearance of connective tissue and cause fibrous degeneration of the underlying retina. In those cases, however, in which the same ophthalmoscopic picture is found without hemorrhages or remains of such, it may well be a different disease and quite another pathological process, thus again proving that distinct diseases may eventually produce the same final results, and therefore often be falsely designated by the same name.

TREATMENT OF PTOSIS.

By Dr. A. MEYER, of Wuerzburg.

Translated by Dr. J. A. Spalding, Portland, Me.

(*With two illustrations in the text.*)

A GREAT many ophthalmic surgeons have asked me to publish a procedure for ptosis which I have personally applied to my own eye for the last five years. The point in question is not an operative method, but an apparatus to prevent the recurrence of ptosis. I have hesitated a great deal to do this, because I know how very difficult it is to represent the little apparatus exactly, and furthermore because it requires a person of no little intelligence, and after not a few experiments to understand its working in a comprehensive manner. More than that, it is very desirable that the patient himself should thoroughly understand the principle at stake, so that he can make plain to the physician and to the mechanic whatever mistakes there may exist in the apparatus, on account of which, as the apparatus must be arranged specifically for each case, more or less insecurity may result and the desired intention be thwarted. Owing, then, to these necessary conditions I am far from regarding my contrivance as being the best for every case. But if I can communicate to my fellow practitioners the experience which I have personally obtained by the contrivance of the apparatus, and accurately emphasize the various points upon which the greatest stress is to be laid, I believe that one or the other may obtain some advantage for patients afflicted with ptosis.

The *Centralblatt fuer Augenheilkunde* for 1890, p. 34, has an article by Goldzieher "On a Simple Procedure in cases of Ptosis and Senile Entropium," in which is described a spectacle frame for the treatment of ptosis.

"The apparatus consists of a horn spectacle-holder to the upper rim of which is attached a horn plate, the free margin of which is moderately curved. When the frame is placed on the nose, and pushed close to the eyes, the free margin of the plate will be pushed in under the orbital ridge, so that it not only elevates the lid, but prevents its falling again, acting thus as a sort of crutch."

Goldzieher insists that this arrangement must be fitted for each special case, according to the anatomical peculiarities of the patient's face and orbit. He then describes the ptosis operations devised by Pagenstecher and Panas, and emphasizes their cosmetic failures. With the latter assertion I can only agree, for, to say nothing of the cicatrices, the operation never restores to the diseased eye the fold in the upper lid beneath the orbital ridge, so that the eye loses part of its expression and the patient remains forever deformed to a considerable degree. These are the disadvantages of the operative procedure, to say nothing of the lack of success in restoring the function of the lid.

I must reject Goldzieher's apparatus, as unsuitable because, although it takes into consideration the elevation of the lid, it is impossible with the contrivance in position for the patient to close the eye; he cannot wink.

My apparatus, on the contrary, not only restores the expression to the eye by the preservation of the fold in the upper lid, but the patient can wink in a natural fashion even when the apparatus is *in situ*.

Helfreich has mentioned my apparatus in a note on Goldzieher's contrivance in Michel's *Jahresbericht* (1890, p. 400), but I doubt if any one can form a clear idea of the same from his brief description. For these reasons I will now attempt a description, as I have used it for some years.

Figures 1 and 2 appended at next page show the original apparatus and the modified form as now worn.

The apparatus is easily applied, and but slightly visible at a moderate distance.

Mine was a case of traumatic ptosis due to an extensive rupture of the upper lid by the blunt end of a mountain stick. The cicatrix, slightly visible at the external canthus, was caused by a plastic operation made five years ago to take the place of an extensive cicatrix due to the original injury.

FIG. 1.

FIG. 2.

The attempt to excise a fold of the skin from the upper lid, or by the formation of subcutaneous suture-cords toward the forehead so as to elevate the lid, succeeded but partially and the cosmetic defect became more visible.

The operations enabled me to lift the lid so that about one third of the pupillary opening came into view, but it required considerable exertion, and the right eyebrow had to be elevated, which, in connection with the smooth transition of the upper lid into the forehead, caused considerable deformity.

But more than this, inasmuch as the injury was accompanied with fracture of the bone, the right eye suffered an impediment of mobility, associated with extremely disturbing diplopia, and I felt necessitated to construct an apparatus which should allow me free use of the injured eye, in order to oppose by uninterrupted exercise the existing diplopia.

The ordinary ptosis forceps, which, by raising a fold of skin, maintain the eye open most perfectly, nevertheless have the great disadvantage that even with the lightest instruments œdema of the lid ensues in a short time. Such an instrument I tried for a while, but was soon compelled to lay it aside.

My further investigations led me into the line of elevating the lid without interfering with its circulation. And starting out with the conviction that a single spring wire which, like the English monocle, could be pushed up under the orbit, and then supported upon the nose, must prove of use, I gradually constructed my present apparatus. I will now describe the origin of the definite form, because, from what I may have to say, one can most easily see how to avoid the difficulties which almost conquered me in my attempts.

The apparatus consisted first of the finest steel wire, and after several experiments I attained the form as exhibited in Fig. 1. The upper convex branch was pushed, with a fold of the skin of the upper lid, resembling that on the healthy side, up under the upper orbital margin. The lower branch was so formed as to lie close beneath the eyelashes of the lower lid, and so bent under the internal canthus that it found support against the nose. In order to get sufficient elasticity, a sort of loop corresponding to the external canthus was made as is shown in the engraving. The two free ends were made to terminate in small buttons.

On forming this accurately to the eye, according to the anatomical relations of the orbit and lids, the eye remained open, but it soon happened that the forces acting downward and outward upon the wire during the act of winking gradually tended to push it out at the external canthus. Additionally the twist in the wire at the outer side was too striking and observable. In order to obviate the latter, I tried to interpose between both branches of the apparatus an extremely thin and tightly coiled up spring, which being so difficult a task in steel or iron wire I had resort to all sorts of materials, nor did I fail to recall that steel was hard to mould to the parts.

I found after many experiments that 18 k. gold was the best material, for with the desired spring this could be easily interposed between the two branches, and the whole apparatus made in one piece.

In order to prevent the winking of the lids from thrusting out the wire, I attempted to gain a right angle of sup-

port between the nose and the upper orbital ridge by giving to the upper branch an angular bend as seen in Fig. 2. In this way I at once reduced the tendency of the wire to be pushed out of its situation. The free ends terminated in a very fine bend as seen in Fig. 2.

The thickness of the wire, barely one half *mm*, as well as the length of the interposed spring, and the elasticity and mechanical resistance of the lid elevator, must be fixed by experiments. In this way I succeeded in supporting the upper lid sufficiently, and yet in not preventing the orbicularis from overcoming the elasticity of the spring sufficiently to enable the eyelids to close perfectly during the act of winking.

Finally, the experiments resulted in the arrangement as figured in Fig. 2, but I would emphasize the fact that inasmuch as it must fit closely and smoothly to the parts for which it is adapted, it is plain, that all of the curvatures of the wire cannot lie in the same plane, so that particular attention must be paid to this peculiarity in each given case. With patience on the part of both patient and surgeon all of these difficulties can be overcome in time, and a useful apparatus perfected. Once well done it will last, as I have demonstrated by one that I have worn for some years without repair, and day after day without removal. I am generally obliged to look into a mirror in order to put the apparatus into place, but I can insert it by the touch. I can also state with confidence that I have never known it to irritate the eye in the least. The cosmetic success is plainly visible in the photographs.

In conclusion I hope that my suggestions may be of use to patients and ophthalmic surgeons in many a difficult case of ptosis.

OBSERVATIONS OF CONTRACTION OF THE VISUAL FIELD ACCORDING TO FOERSTER'S TYPE.

By Dr. O. KOENIG of Breslau.

Translated by Dr. J. A. Spalding, Portland, Me.

(*With twelve visual-field charts.*)

FOERSTER was the first to show that the most important symptom in anæsthesia of the retina, contraction of the visual field (C. V. F.), follows a peculiar type which, in brief, is characterized by the fact that the test object is seen farther toward the periphery when brought from the periphery to the centre, than when carried from the centre to the limits of the visual field (V. F.).

As it now happens that I have lately had an opportunity of observing that the same symptom occurs in traumatic neuroses, I would like to communicate my experience briefly, and to call renewed attention to a symptom that has up to this time met with but little if any attention from the profession.

For the sake of brevity I will, in the rest of this article, entitle this peculiar form of C. V. F. by the name of Foerster's type, or the displacement type, or the D. T. of C. V. F.

I will next remark that full accounts of this symptom can be found in the Transactions of the Heidelberg Congress for 1877, and in these Archives, vol. xii., p. 248, and that in order to establish the displacement type (D. T.) two measurements of the field (M. V. F.) with opposite movement of the test object are needed. If at the first M. V. F., we move the object invariably from the temporal to the nasal side, and note in each meridian the place where the object appears and disappears, then in the second M. V. F., the

object must be moved from the nasal to the temporal side. Then we get two fields with intersecting borders, each of which is more extensive than the other in the direction from which the object was introduced into the V. F.

All of the fields except that shown in Fig. 8 were obtained by this method, and in order to understand them nothing more is necessary to say than that the arrows with continuous and interrupted lines indicate the direction in which the object was passed in the M. V. F., denoted by the same sort of contours. The plans were drawn on Foerster's schemata,[1] and a white quadrant 5 *mm* square employed as a test object.

I must emphasize the important fact that Foerster's observation furnishes us with a new and an *objective* symptom in pathology. The argument that this form of V. F. can be simulated seems to be futile, for only an expert could be sufficiently initiated into the displacement type as not to be detected. It is even doubtful if any amount of practice with the perimeter could enable any one to draw such a V. F. without errors. A malingerer to this extent would be a phenomenon. In a word, simulation seems to me to be so absolutely impossible that we need not dilate our article to discuss such an event in every-day practice.

I have remarked that but little attention has so far been paid to the extreme importance of Foerster's type. With the exception of Wilbrand's excellent paper already referred to, it is difficult to find any remark on the displacement type in any articles on neurasthenic asthenopia and allied disturbances. Amongst the few papers that have appeared upon this topic, I may refer to those by Thomson and Oppenheim,[2] Horstmann,[3] Schiele,[4] Pflueger,[5] and Voelker,[6]

[1] *Klin. Monatsbl. f. A.*, 1883, Supplement, p. 131.

[2] "Ueber das Vorkommen. u. d. Bedeut. d. sensor. Anaesthes. b. Erkrank. d. Central-Nervensystems." *Arch. f. Psych. u. Nervenkrankh.* Band xv., 1883.

[3] "Anaesthes. ret. als Theilserscheinung. allgem. Constitutions-Anomalien." *Zeitsch. f. klin. Med.*, Band xii., 1887; and *Deutsch. med. Wochensch.*, 1885. p. 335.

[4] "Co-Excitations in the Regions of Homonymous Visual Fields." These ARCHIVES, xvi., 417.

[5] Bericht ueber die Jahre 1884–1886. Bern, 1887.

[6] Beitrag. z. Casuistik d. Gesichtsfeldamblyopie. Inaug.-Dissert. Berlin, 1886.

but even in these Foerster's method and the results obtained are merely mentioned and nothing more. Furthermore, the most recent hand-books on diseases of the eye either make no mention at all of the V. F. symptom, or they hint at it in so obscure a fashion that no one can get an exact idea of what they mean. Some remark that in anæsthesia of the retina the V. F. is subject to great variations, a remark which undoubtedly corresponds to the exact state of affairs. But in direct opposition to this we know that the variations in the V. F. entirely disappear when the test object is carried in the same direction time after time. More than that, we know that the extent of the field varies with various and repeated measurements. After all, however, in the D. T. we have an *objective* symptom which, without the patient's knowledge distinctly establishes an actual contraction of the V. F.

Before appending the cases that I have seen, I will remark that the histories are often defective, because the patients merely came to the clinic, and some of them never reported a second time, or sufficiently often to enable careful notes to be made.

CASES OF INJURY OF ONE EYE, WITH CONTRACTION OF V. F. AND D. T. IN THE OTHER EYE.

CASE 1.—A boy of eighteen received a cut in the upper eyelid with puncture of the globe. When I first saw him in July, 1883, the upper lid of the right eye was united by a cicatrix to the globe, which was shrivelled in the posterior segment, cornea clear, pupil distorted, and behind the lens a gray immovable mass with a red reflex. On looking upward and inward the red reflex from the fundus is visible. Fingers counted downward and outward at three feet.

The same condition was discovered in October, only vision had still decreased. In the other eye, with vision of $\frac{20}{30}$, pronounced optic neuritis. Examination with the perimeter revealed to our great astonishment the well known type of C. V. F., as in anæsthesia of the retina (Fig. 1).

The same condition existed in January, 1884.

CASE 2.—A girl, æt. twenty-four, injured her right eye in March, 1883 with a large needle.

April 1.—Right eye, leucoma adherens, occlusion of the pupil, good perception of light. Iridectomy.

April 12th.—Eye free from injection, iris coloboma perfect, lens slightly opaque, fundus illuminated with difficulty. Fingers counted.

The patient did not return till October, and then only on account of diminution of the sight of the left eye within the last fortnight. The right eye was free from irritation, but the artificial pupil blocked with lymph, and the anterior chamber very shallow. T—2. A candle was perceived as a spot of light at six feet.

Left eye. Typical sympathetic irido-choroiditis, with fine spots on Descemet's membrane; pupil slightly enlarged, round and rigid, but not dilating after atropin. T=1, v=$\frac{20}{200}$, and Snellen 3. Mercurial inunctions.

V. F., examined November 7th, and found typically contracted as by Fig. 2.

The patient was discharged in three weeks; $\frac{20}{40}$; pupil adherent and occluded, but the papilla visible. The V. F. is shown in Fig. 3.

January, 1884.—The patient remained about as before, but owing to severe neuralgic pains about the right forehead and temple the right eye was enucleated. Previous to the operation the patient suffered from psychical hallucinations, saw mice and other creatures. These phenomena promptly disappeared after the removal of the eye. The V. F. remained about as before, somewhat less contracted than in Fig. 3.[1]

Case 3.—A boy, æt. fourteen, was hit in the left eye with a file. Long perpendicular cicatrix at the outer corneal margin, with incarceration of the iris and ciliary body. Atrophy of the globe. Two weeks later, November 5th, discharged with a shrunken globe, sensitive to the touch in the ciliary region, vision nil. Right eye, high degree of Hm, with amblyopia. V. F. not tested.

Three months later, the same sensitiveness in the scleral region. Right eye, vision $\frac{20}{200}$; V. F. typically contracted. Fig. 4. Enucleation of left eye.

[1] I would remark that, owing to an oversight, the lines of the schemata which represent a normal V. F. have been drawn about as heavily as those of the two pathological fields, so that the distinctness of these figures where the two limits intersect has suffered. But any one can determine from Fig. 1, the limits belonging to the normal V. F.

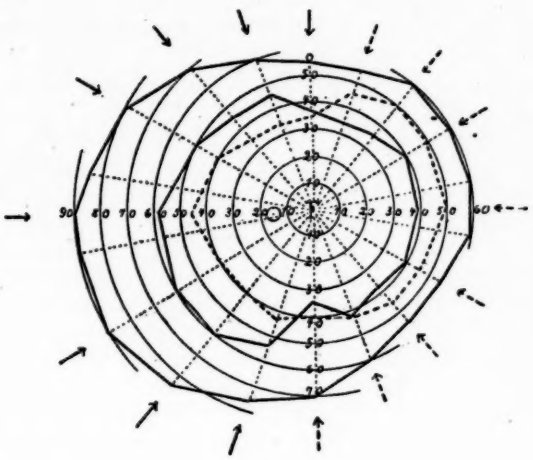


FIG. 1.

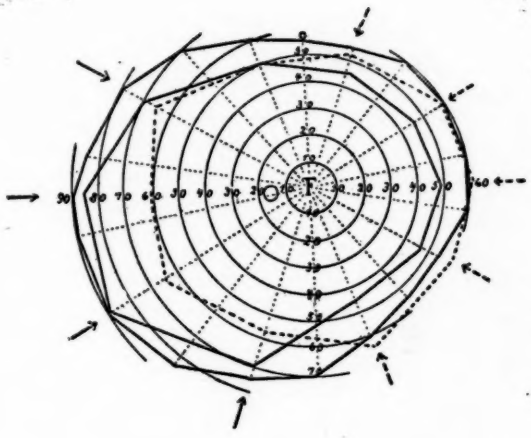


FIG. 2.

January 4, 1884.—V. F. normal, no matter in which direction the test object is moved in the perimetrical examination. Vision $\frac{20}{30}$.

Case 4.—A boy, æt. eleven, injured his left eye with a bit of percussion cap, July 4, 1884.

July 9th.—Injury at inferior margin of cornea, considerable injection. Cornea and lens intact. Vitreous filled with a bloody exudate. Foreign body not visible. T—2; fingers, indistinctly close to the eye.

July 31st.—Fundus visible, exudate contracting, and close behind the lens a shiny particle can be seen, which in a few days proves to be the edge of the gun-cap. Fingers; T normal. Right eye, vision perfect, but the visual field contracted as in Fig. 4. The foreign body was extracted by scleral incision August 6th, but, though the incision healed by first intention, the sight remained destroyed. V. F. in the right eye remained, at the last visit in August, typically contracted.

Case 5.—Paul R., aged eight, was cut with a knife, five weeks before, in the ciliary region of the right eye. He was treated at first in another clinique, where finally enucleation was proposed. By the end of September, 1884, the right eye is somewhat atrophied, with a cicatrix at the outer margin of the cornea, with a small granulation attached. Pupil irregular, and vitreous hazy. No notes of the condition of the left eye are available. The injection of the right eye was reduced by the use of salicylate of sodium, and for that reason enucleation was postponed, as there were no subjective sensations on the part of the left eye.

The first examination of V. F. of the left eye on October 5th showed a typical case as in Fig. 5, November 7th, the sight of this eye fell a trifle below normal, but on the 8th it was once more normal, and the papillitis had disappeared.

It is not a new thing to see C. V. F. in the second eye after an injury to its mate. Mooren seems to be the first to have observed this symptom.[1] The case that he cites from v. Graefe[2] really does not belong in this category, as Brecht insists in presenting a similar case of his own.[3] Additional cases are to be found in Reich[4], in one of which, after total

[1] *Symp. Gesichtsstörungen*, 1869, and *Ophthal. Mittheil.*, 1873.
[2] *v. Graefe's Archiv*, 1857, Band iii., 2, p. 442.
[3] *v. Graefe's Archiv*, Band xx., 1, p. 97.
[4] *Klin. Monatshl. f. A.*, 1889, Band xvii., p. 106.

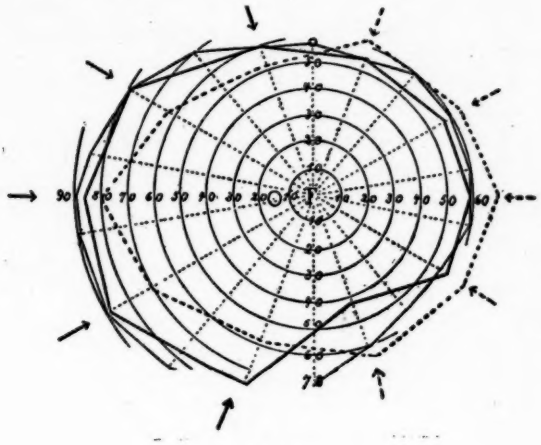


FIG. 3.

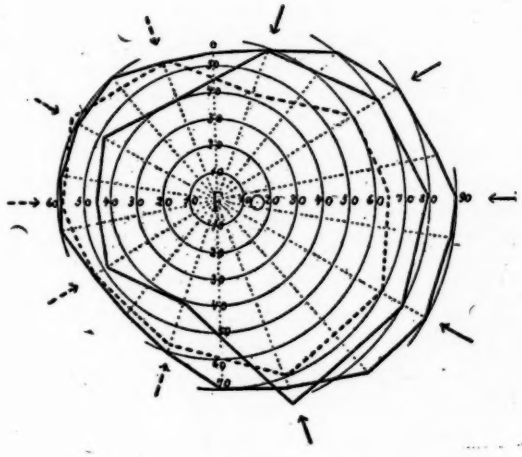


FIG. 4.

destruction of an eye by gunshot wound, contraction of V. F., which the author regarded as sympathetic, was seen in the sound eye. I would emphasize, that in all of our cases in which any C. V. F. was observed, it invariably assumed the D. T.

All of the authors that I have named considered their contraction of the field as sympathetic, an idea that I cannot accept without some reserve so far as my cases are concerned. The main argument against sympathy is the presence of the displacement type, although the diagnostic significance of the same has not as yet been precisely defined, owing to the scarcity of clinical material. Still, it is just now receiving some support, owing to the fact that it has been only observed in anæsthesia of the retina or neurasthenic asthenopia; and in a disease that is very nearly related to the latter, viz., traumatic neurosis. Therefore, so long as we have no proof that it ever appears under any other circumstances, its simple presence argues in favor of a neurasthenic asthenopia rather than in favor of a sympathetic neurosis. I might also hint that most of the patients were young and one of them an hysterical girl, and then suggest that neurasthenic asthenopia is much oftener seen in children than in persons of adult age. And so far as sympathy is concerned, let us not forget that everything that is seen in the second eye after an injury to the first is without rhyme or reason invariably referred to sympathetic irritation. Therefore, so long as we cannot plainly prove the presence of sympathy, we shall be inclined to believe that the contraction of the V. F. is decided evidence of a neurasthenia of some sort.

Having noted that Herschel[1] had observed C. V. F. in

PARESIS OF ACCOMMODATION AFTER DIPHTHERITIS,

which disappears when the accommodation is restored, we turned our attention to similar cases, and at once discovered a normal V. F. I would remark that Herschel only found contraction in five out of thirteen cases. A careful and regular watch for such patients later revealed to us five typical

[1] *Berlin. klin. Wochenschr.*, 1873, No. 30.

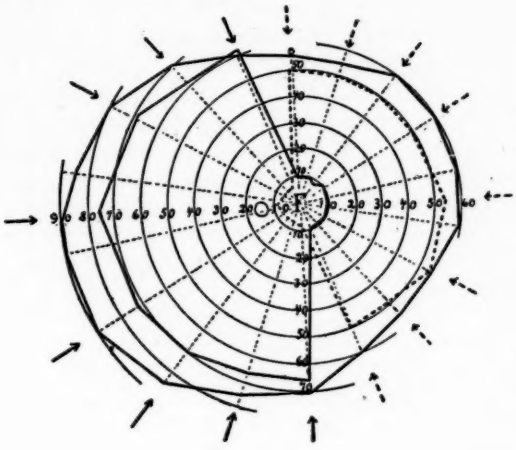


FIG. 5.

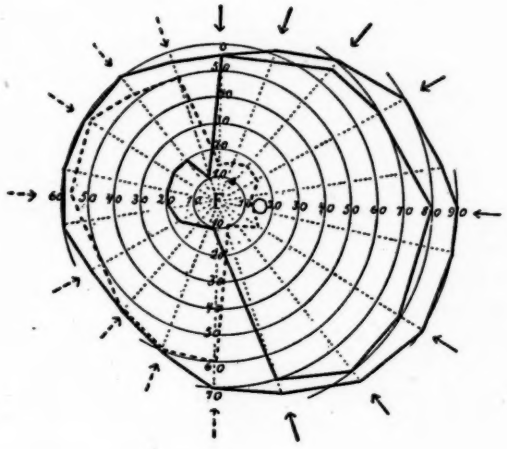


FIG. 6.

cases of C. V. F., with Foerster's type, concerning which, by the way, Herschel says nothing at all.

Case 6.—Hedwig, æt. thirteen, had diphtheritis five weeks before, and had suffered for three weeks with paralysis of the velum, and still more lately has complained of disturbance of vision. Vision normal for distance with +24 and +17 for near. *C. V. F. in marked degree with the D. T.* (Figs. 5 and 6).

It is well to observe that whilst the contraction for the object brought from the periphery to the centre amounts to barely 20°, it amounts to 50° and even as much as 80° when the object is carried from the centre to the periphery. In other words, the perception of the object ceases when it has passed but a few degrees beyond the point of fixation. The paresis of accommodation rapidly disappeared under the use of appropriate lenses, and the V. F. increased in extent, but even after the total disappearance of the paresis of accommodation there was slight contraction for the object passed centrifugally.

I wish to call especial attention to the *approximation of the far point* in this case, for it was *repeatedly* observed, and corresponds, as I wish to recall to memory, to similar observations in anæsthesia of the retina.

Case 7.—Paula, aged eight, complained about Christmas, 1884, of weakness of the sight after diphtheritis. I discovered the same symptom concerning the far point as before, and similarly, excessive contraction of both V. F., with well marked displacement type. The schemata have been mislaid.

Case 8.—A boy, æt. twelve, had suffered from diphtheritis a few weeks before. July, 1885, all the symptoms of paresis of accommodation and velum; V. F. moderately contracted, but nearly normal for the object centripetally led. The difference between the two M. V. F., in the individual meridians, amounts to between 5° and 10°. In August the difference between the nasal halves of the V. F. had almost disappeared, but those in the temporal amounted to 6° to 16°. We often discover that this difference in the nasal half of V. F. is on the average less than in the temporal, so that the difference first disappears in the nasal half.

Case 9.—Marie, aged nine, accommodative paralysis after diphtheritis, with normal optic papillæ. Medium C. V. F., with well marked type. The figures in both eyes greatly resemble Fig. 7 of the following patient.

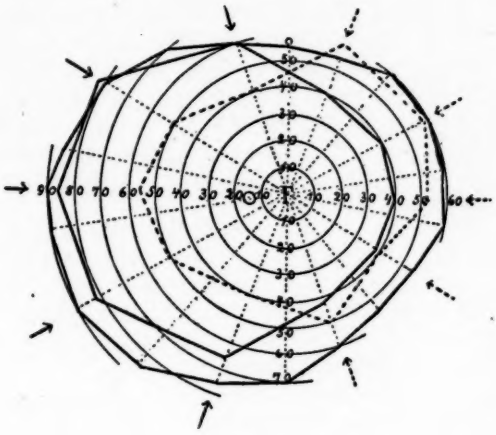


FIG. 7.

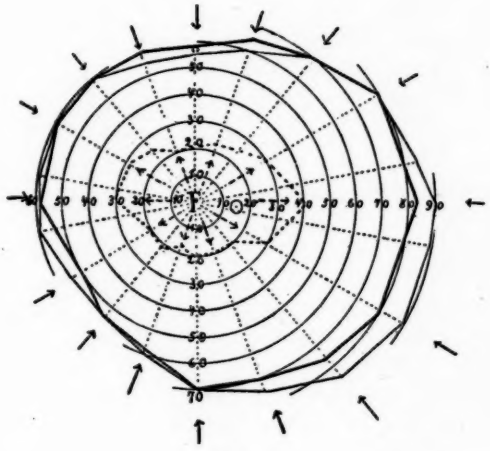


FIG. 8.

Case 10.—Emily, æt eight, suffered from slight swelling of the cervical glands five weeks since. Lately she has developed loss of accommodation, is easily wearied, eats but little, and talks a great deal in her sleep. Every three weeks she complains of spasm in the head, with violent pain. February, 1886, hypermetropia, normal sight, with proper lenses, accommodative paralysis, and vacillation of the far point. V. F. extremely contracted, and typically. (Figs. 7 and 8.)

In the latter figure, the symptom of D. T. was fixed by the test object being first carried from the periphery to the centre, in the first measurement; and in the second, from the centre outward.

The patient was unable to read without hesitation for a long time, despite the use of proper lenses. Previously she had been able to read without any difficulty.

The C. V. F. continued without much, if any, alteration along into March, but in April it began to decrease, and by the end of the month it was nearly normal. The capacity for reading also began to increase, and at the end of the month vision was nearly perfect, and the eyes were able to bear any amount of light and to read without difficulty.

In meditating upon these cases, I come to a conclusion diametrically opposite to that reached by Herschell, who wants to separate them distinctly from genuine hyperæsthesia of the retina, "that neurosis of the retina first described by v. Graefe, and later studied more in detail by Steffan and Foerster," and regards the C. V. F. as due to the direct action of the diphtheritic poison upon the retina, as we assume it to act upon the nerves of the accommodation. On the contrary, I regard these cases as actual cases of anæsthesia of the retina, and I offer positive facts in support of my assertion.

Thus in Case 10 we had in addition to the paresis of accommodation the rapid weariness, photophobia, and incapacity of utilizing the retinal images of fine objects. Even when we used the strongest possible convex lens, the patient could only read with difficulty. The observation, that even when the paresis of accommodation had disappeared, the hypermetropia was no longer manifest, argues in the same line of thought. Then, in Case 6, though photophobia was absent, we saw the approximation of the far point, a symp-

tom so frequent in true anæsthesia of the retina that I must acknowledge to it conclusive force. In the three remaining cases we have nothing left but Foerster's V. F. type to support the diagnosis of anæsthesia of the retina, and even this has not yet won universal acceptation as a symptom. Therefore we shall be obliged to take it for granted that the children suffered from a neurasthenic condition, which possibly was previously present, but only became a contingent symptom when the diphtheritis excited it into active agency. Hence the diphtheritic virus would only indirectly cause the C. V. F., in the same sense as other severe constitutional disorders produce anæsthesia of the retina, and thereby are enabled to excite the contraction of the field.

In concluding this section, I would remark that all five of these patients *suffered from paralysis of the velum.*

The following is a case *of neurasthenic asthenopia*, which as such would not be of any particular interest, but is important in that the morbid picture was confused by the presence of a *paresis of the* SYMPATHETIC, a complication which is in this case more accidental than in the preceding.

CASE 2.—Margaret, æt. twenty, May, 1884, complains of flickering before the eyes, lachrymation, and incapacity for reading or any close work for the past year. Photophobia, sympathetic paresis, in that the *left* palpebral fissure and pupil are perceptibly narrower than the right. The left lobe of the thyroid gland is enlarged. The patient has observed greater warmness and fulness on the left side of the face. *Perspiration is observed on the right side only.* She also blushes solely or at least much more noticeably on the right cheek. The patient is pallid, and invariably has a pulse of over a hundred at the clinique. At home it is slower.

The eyes are normal in every respect, with the exception that the V. F. in both is typically contracted as in Fig. 7.

Treatment, potass. iodidi. After using 40 grm. iodism, with conjunctival catarrh, which proved obstinate. The iodide was discontinued after using a little while longer.

By July the swelling of the thyroid and the diminution in the size of the palpebral opening had decreased.

During this period the V. F. was repeatedly tested in each eye, but always with the same result. The contraction remained typical. Curiously enough, the patient asserted that the weak zinc lotion prescribed for the iodidic conjunctivitis caused intense pain and lachrymation in the *left* eye, while in the right there was no irritation at all. This sensitiveness of the left eye gradually disappeared.

We saw the patient for the last time in September, when the eyes were normal in function, but the C. V. F. still persisted in both eyes, though to a less amount than in July.

TRAUMATIC ANÆSTHESIA OF THE RETINA

has long been recognized, but the number of cases is much less than those of the spontaneous sort. It is, however, unfortunate that all, or most of the cases of traumatic nature were reported years ago, and that the M. V. F. are not reliable. The following case came under my observation, *and revealed the well known Foerster's type.*

CASE 12.—Carl, æt. forty-five, injured his right eye in the autumn of 1871, so that it had to be enucleated. The left eye began to fail about two years ago, so that a lens was necessary for near work. June, 1885, a spark struck the left eye, and was at once treated in the workshop with ice-cold applications. As the sight, however, steadily decreased, the patient was brought to the hospital, where he was treated with eye lotions and internal medications. There is no note of any severe injury of the eye, and the patient was discharged in a week or so, though the sight remained very much diminished. He reported from time to time, but up to May, 1886, when he came for an official report concerning his ability to perform any manual labor, there had been absolutely no improvement in the sight, if really what he had amounted to useful vision at all.

May 8, 1886.—Anophthalmus right side. Left eye *without a trace of any injury.* Cornea and aqueous transparent, iris and pupil normal. The lens shows a few faint opacities, but the fundus is perfectly visible through them. No abnormity in the fundus of the eye. Refraction em., T normal.

The vision, which one would hope ought to amount to at least $\frac{1}{1}$ and the capacity to read fine type, actually amounts to the

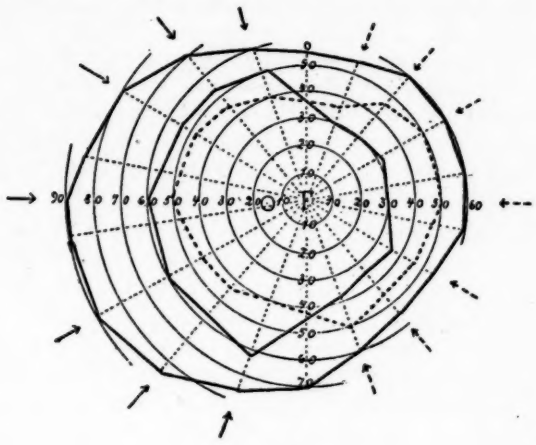


FIG. 9.

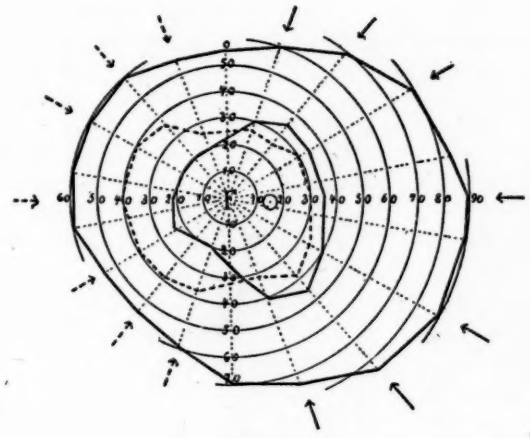


FIG. 10.

counting of fingers at 5 feet, and deciphering of Sn. XVI. with + 5 at 2 inches.

The perimeter reveals no scotoma, but typical C. V. F.

The V. F. was repeatedly measured for verification, but always found typically contracted. The patient feels perfectly well, can walk by the day without fatigue, but cannot see to do his former work as a blacksmith. The eyes are free from every subjective sensation, except the amblyopia.

I do not see how I err in calling this *a case of traumatic anæsthesia of the retina*, and I am sure that it is difficult to call it anything else, when we reflect upon the normal condition of the fundus after the disease had lasted a whole year. Still I do not affirm that the slight injury excited the disease, but that *a neurasthenic asthenopia must have existed some time before*, as seems established by the patient using glasses at an early age. Possibly this is the case in all of these patients, so far as reported, for generally the injury stands in disproportionate minuteness to the magnitude of the subsequent loss of sight. I would also like to suggest, that Cases 1 to 6 might be included under the heading of traumatic anæsthesia of the retina. This case (12) is of great value as establishing the importance of Foerster's type of V. F., *as a preventive against simulation*, for this man with no sign of injury in the eye, might easily have been regarded as a malingerer.

CASE 13.—This is merely the drawing of the V. F. of a cigar-maker who had been hit in the right eye with the fist of an opponent two days before.

Here the differences between the M. V. F. are on the average *smaller in the temporal halves of the V. F.* than in the nasal. Left eye normal.

The next three cases fall under the title *of supra-orbital neuralgia.*

CASE 14.—Marie, aged twenty, complains of pain on the left side in the region of the supra-orbital nerve. *Typical C. V. F. in both eyes.* The fields resemble Fig. 1. The left eyesight was somewhat more affected than that of the right.

CASE 15.—Henry, aged twenty-four, with typical infra- and supra-orbital neuralgia with well-pronounced C. V. F., in both eyes *and the displacement type.*

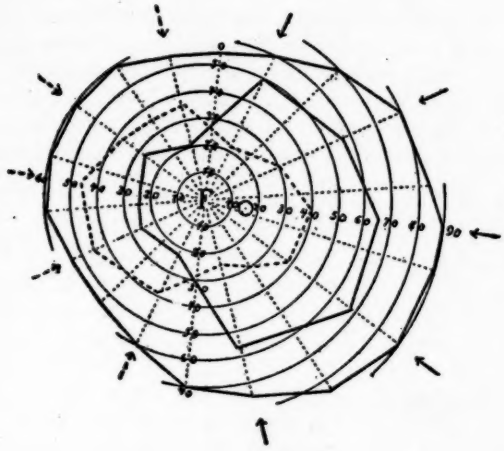


FIG. 11.

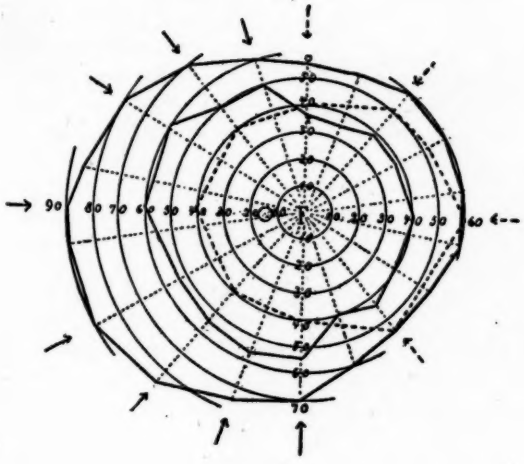


FIG. 12.

CASE 16.—Anna, aged sixteen, complains for the past three weeks of pains in the forehead, first right then left, and so violent at times that they prevent her from working. Similar condition three years since. The headache does not depend on near work. Photophobia to artifical light. Patient rather timid at little things. Right supra-orbital nerve sensitive to pressure. Both eyes myopic. Both V. F. typically contracted and to a marked degree.

IDIOPATHIC HEMERALOPIA.

CASE 17.—Hermann, aged thirteen, has been unable to find his way about at night for two months. Photometer, $\frac{1}{10}$. After four day's sojourn in a dark room, the hemeralopia disappeared. The right V. F. exhibited *typical contraction*. The left field was not perimetered.

CASE 18.—Pauline, aged thirty-eight, defective vision of late by dusk and darkness. In bright light no defect complained of. Myopia. Media transparent. V. F. of right eye is shown in Fig. 11. That of left eye similar. Laxatives ; dark room.

After some weeks of treatment there was but slight improvement in the hemeralopia, but the V. F. remained the same.

The subjoined case of GLAUCOMA exhibited surprising results.

CASE 19.—Carl, aged seventy-three, was suddenly attacked in January, 1885, with pain in the left side of the head, and redness and irritation of the left eye. On the following day the typical picture of glaucoma acutum had fully developed. The perimeter showed a condition as in Fig. 12.

The right eye was also tested in the horizontal meridians and exhibited a similar contraction.

Inasmuch as the patient could not arrange his affairs so as to have the operation performed at once, the attack was treated with eserine and salicylate of soda, with the result that in a few days vision and V. F. were nearly normal, and the displacement type had disappeared. March 1st the patient suffered from a second attack of glaucoma and on the next dry was iridectomized. At the last examination, a short time since, V. F. was normal in each eye.

CASE 20.—A medical student addicted to morphine complains of flickering before the eyes and periodic obscuration of V. F.,

with attacks of vertigo and pressure on the forehead. The V. F. is normal for the test object carried toward the centre, but the difference between the two M. V. F. amounts in the left eye from 5° to 20°, and in the right eye to between 30° to 35°.

Finally I have lately heard of a patient with Foerster's type who suffered at one time from neurasthenia, and who ultimately developed and died from dementia paralytica.

So far as any opinions can be drawn from these observations, I have said what was necessary at the proper place, and therefore my conclusion to this paper may be brief. It was my aim to point at the frequency as well as at the importance of Foerster's type *as an objective symptom, which deserves to be tested both as to its absence and to its presence, as much as the contraction of the V. F. itself.*

Instead of carrying the test object directly across the entire field, which Schiele calls the diametrical method, he has suggested a variation in which the test object is always carried in a centripetal direction to the point of fixation, not simply to the limit of perception. Schiele calls this the *complete radial centripetal method,* and it has given me many very interesting results. Still in a *practical* point of view it falls behind Foerster's method, amongst other reasons *because the displacement type when present can be demonstrated in a few minutes.* For the two tests with diametrically opposite conduction of the test objects hardly need a pause between. The symptom in question can therefore be easily discovered in one's office hours, provided that the patient is intelligent enough to determine the limits of his V. F. upon the perimeter.

I have spoken plainly enough my own opinion concerning the diagnostic value of Foerster's type of C. V. F. in the previous pages, but further investigations will be necessary to tell us whether it is *actually pathognomonic for neurasthesia,* so that it can always be utilized in a differential and diagnostic point of view.

THE SUBJECT OF THE DESIGNATION OF THE PRINCIPAL MERIDIANS IN ASTIGMATISM,

AS BROUGHT BEFORE A MEETING OF THE SECTION ON OPHTHALMOLOGY OF THE PHILADELPHIA COLLEGE OF PHYSICIANS.

By Dr. G. C. HARLAN, Philadelphia.

I THINK it will be admitted that it is desirable that a formula for glasses, wherever written, may have a definite, precise, and uniform meaning in all parts of the world. Since the adoption of the metric system this is now the case where spherical lenses only are concerned, but is very far from being the case where cylinders are involved. A glance at some of the recent text-books will show at once the diverse and too often loose and random way in which the important matter of designating the direction of the axes in astigmatism is still generally treated. Landolt prefers to make the top of the vertical meridian his starting-point, and number right and left to 90° at the horizontal meridian, but gives no reason for his preference. Javal places zero at the left end of the horizontal meridian, and numbers to 180° at the right end; but estimates right and left with relation to the observer, and not, as we do, with relation to the patient, so that his zero corresponds with our 180°. Galezowski makes no reference to the subject, and Fuchs ignores all meridians but the vertical and horizontal. Schmidt-Rimpler adopts the same plan as Landolt does, and Schweigger does not advocate any system, but merely tells us to "direct the optician." Neither Juler, Berry, nor Swanzy gives any directions for designating the meridians; while Hartridge, more definite if not more

scientific, advises the reader to indicate the axis "by drawing a line through a diagram furnished by the optician."

Swanzy, in an article urging the importance of uniformity in the designation of meridians (*Ophth. Rev.*, July, 1886, p. 208), states that there are at least five systems in use in the United Kingdom, and that Continental countries have no greater uniformity. He favors the system which, he says, has the advantage of being in general use in the United States, but states it incorrectly. He says: "0° is placed at the right-hand end of the horizontal meridian of each eye of the trial frame—the latter being viewed from the *front*—and 180° at the left-hand end; 90° coming at the lower end of the vertical meridian." The fact is that 90° comes at the upper end of the vertical meridian, so that our graduation proceeds in the opposite direction to that which he indicates.

An element of confusion is introduced into the identical method of notation by the question whether the terms right and left are understood, in the direct sense, in relation to the patient, or in reference to the observer facing the patient, and has been the cause of much misunderstanding. A commission appointed by the French Ophthalmological Congress in 1887 to consider this subject, composed of Javal, Martin, and Parent, objected to the plan of numbering each way from the top of the vertical meridian, which seems to have been the only symmetrical plan considered, chiefly because it involves the duplicating of numbers, and reported in favor of retaining the identical method then in general use. As to the direction in which the graduation should proceed, they recommended the system, borrowed from astronomers, according to which the numbering follows the course taken by the hands of a clock, and approved the plan that had been universally adopted by their American *confrères* for some years, viz., to place zero at the end of the horizontal meridian to the patient's left, and count on the upper semicircle to 180° at his right. That this plan has not been followed by at least one member of the commission, is shown by this autograph prescription of Javal, in which zero is placed at the patient's right. It would have

been filled incorrectly by the Philadelphia optician to whom it was sent if it had not been accompanied by an explanatory diagram. It is, in fact, in accordance with the system in general, if not universal, use in France—commencing at the patient's right, and numbering on the upper semicircle to 180° at his left. The conclusion of the commission was opposed by Landolt, Meyer, and other members of the congress, who preferred the symmetrical method, and after a long discussion the question was postponed.

The following extract from a recent publication entitled *A Hand-Book of Spectacle Adjusting for the Use of Jewelers and Opticians* furnishes a contribution from the optician's standpoint: "It will be observed that the vertical meridian is always at ninety degrees, while the horizontal meridian may be either zero or one hundred and eighty degrees; and it should be further noted that these figures refer to the frame as it sits on the patient's face and is seen by the optician standing in front of it. This is sometimes a difficult matter to understand (where to commence and where to end counting), and I have introduced the diagram in the hope of making it plainer. My experience with opticians leads me to believe that many of them do not have clear and definite knowledge of this matter; and it sometimes proves itself a bugbear even to those otherwise well informed. I remember, a great many years ago, hearing one of the medical students attending the clinics at the Wills' Eye Hospital (the most noted hospital of its kind in Philadelphia) ask the surgeon in charge, who was an eminent oculist, where the numbering commenced of the degrees used to denote the position of the axis of cylindical lenses. The oculist replied, on the right; then corrected himself and said, on the left, and seemed to be confused; and was really unable to give a definite reply to the question until he had called for a trial frame and given the matter several moments' consideration. One would think an oculist of age and experience would have been able to answer this question without a moment's thought, and yet this little incident serves to show that this question may prove a source of confusion as well to the educated physician as to the less pretentious optician."

I think I have said enough to show the confusion in which this important matter has been allowed to remain and the entire absence of anything like a uniform system. As to the system now in use generally, but by no means universally, in this country I cannot find that it has anything special to recommend it on the ground either of scientific accuracy or practical convenience.

The first reference to this subject that I can find in American literature is in the *Transactions of the Ophthalmological Society for 1868*, where Dr. Noyes precedes the record of a number of cases of astigmatism with the statement that: "The direction of the axis of the cylinder is always given according to Javal's notation—taking the upper half of a circle and counting the degrees from left to right from 0° to 180°." At the same meeting Dr. Green also reported some cases of astigmatism, and said: "The system which I have adopted for designating the angle of inclination of the meridian of greatest curviture is to call the vertical line zero, and to count off the number of degrees of inclination on the right hand up to 90° with the plus (+) sign, and upon the left hand with the minus (−) sign. By this plan the important and very interesting fact of the symmetry or asymmetry of the two eyes is distinctly shown." This is the only suggestion I can find, until nearly twenty years later, to designate the meridians with reference to the symmetry of the eyes, which is, after all, as Dr. Knapp has recently claimed, the only scientific basis.

Just when or how the present system of numbering from the patient's left to right, which has been in universal use in this country, originated I cannot make out. I remember that some years ago Dr. Knapp introduced the subject verbally at a meeting of the Ophthalmological Society and that there was a general understanding that this system should be used, but I cannot find any reference to it in the *Transactions*. The trial frames in the Nachet test sets may be considered responsible for it, but I do not know by whose order the first one was made. This plan, since it has become general throughout the country, has served our purposes fairly well, but we have been working with it now for a good many years

and I believe that none of our foreign *confrères* have followed us. It would be a good thing if some plan could be adopted with advantages enough to recommend it to universal use. As Dr. Knapp has taken the initiative in this matter, I wrote the other day to ask him to let us have his views, and he has very kindly sent me the following paper:

"Our eyes are symmetrical to the median plane of the body, as are our hands, ears, feet, etc. The vertical meridian, or one near it, has in the great majority of cases the greatest refractive power. Its upper end is the natural starting-point of our calculations. If we designate it with 0°, or better with *v*, and its deflection towards the nose or temple with so and so many degrees of nasal or temporal deviation, down to the horizontal, *h*, or *90°*, we have a simple and unambiguous system of notation, the value of which remaining the same whether we look through the spectacles, or on them when the patient wears them.

"+ 2.00^{c} 15^{n} means a + cyl. of 2 dioptries, the axis of which is inclined 15° toward the nose. Adding a spherical to it, the formula would read 1.00 + 2.00^{c} 15^{n}, or shorter, + 1. + 2.^{c} 15^{n}. If this is the same for both eyes, the formula is written once only and the word "both" added, + 1. + 2.^{c} 15^{n} both. If they differ, we have to write R. and L. for the right and left eye.

"R + 1. + 2.^{c} 15^{n}; L + 1. + 2.^{c} 45^{n}. If the deviation is on the temporal side, t instead of n is added to the number of degrees. This shows at a glance in what sense and to what degree the symmetry of the meridians is disturbed.

"Since I published this mode of designation of the meridians in the ARCH. OF OPHTHALMOLOGY, vol. xv., p. 207 (1886), I have used it in all cases, in private and hospital practice, and never a question as to its meaning has been addressed to me by an optician or anybody else. Other oculists in New York have adopted it, and opticians (Gall & Lembke, E. B. Meyrowitz, and others) furnish blanks on which, for greater accuracy, the directions of the axes of the cylinders may be marked.

"*The American mode of designation is incongruous*, for instance:

"O D + 1. + 2.^{c}, axis 105°
O S + 1. + 2.^{c}, axis 75°

means the same glass for both eyes, the axis of the cylinder turned 15° toward the temple. This system has had its day, and Javal and his friends have not been able to introduce it into France (see discussion "Sur la Notation de l'Astigmatisme," *Bulletins et Mém. de la Soc. Franç. d'Ophtal.*, 1887, p. 228). At the time when it was introduced the importance of the symmetry of the meridians was not recognized, if it was known at all.

"Two other modes of designation are worth considering:

"*A.—Count from the nasal end of the horizontal meridian up and around to the temporal end, from 0° to 180°.* The words nasal and temporal fall off, and the formulas are simple and unambiguous; 75°, for instance, would be a nasal deviation of 15° from the vertical meridian in each eye, and so on.

"*B.—Count from the upper end of the vertical meridian down the nose to its lower end, from 0° to 180°.* This is equally simple and clear, and shows the preservation or disturbance of symmetry.

"Both these systems have the disadvantage of expressing the slightest deviations from the original meridian by the greatest numerical differences. For instance, if in B the axis of the cylinder in the right eye is vertical, and in the left 5° temporal, it would read R 0°; L 175°. If in system A the axis of a concave cylinder is horizontal in the right eye, and its temporal end is raised only 5° in the left, it would read R 0°; L 175°.

"The mode of designation according to Javal as recommended by Schiötz in the same volume of the ARCH. OF OPHTHALMOLOGY in which I published my proposition (vol. xv., p. 201), is taken only from one method of examination, that of Javal-Schiötz's ophthalmometer. This instrument, though valuable, is cumbersome, and its results cannot be used for the prescription of spectacles without being verified or corrected with the trial case. It has, besides, the drawback of indicating only the positions of the principal meridians, not the axis of the cylinder to be prescribed. The optician must be specially instructed that for + cylin-

ders the axis is as prescribed, but for — ones it is at right angles to the direction noted in the prescription.

"To be familiar with some objective method of examining the refractive state (upright or inverted image, retinoscopy, ophthalmometer) is indispensable, but we have, as a rule, to verify the results by the subjective examination, and the writing out of the prescriptions is, I think, best done in the customary order—first, the spherical glass; then, the cylinder; and, last, the axis, not reversing it as Javal does.

"The designation of the position of the meridians by starting from the upper end of the vertical meridian and noting the nasal and temporal deviations, conveys at once a clear image to the mind, requires no special instruction to the optician, and is in harmony with our usual mode of designating the position of the meridians in anomalies of motility where we say the (upper end of the) vertical meridian inclines toward the nose or toward the temple. Furthermore, it will assist us in finding the relative frequency of the degrees of oblique astigmatism.

"I propose to use the same method also for the annotations of the visual field, for F, as well as the position of the meridians, is symmetrical in its configuration in the two eyes, extending 60° nasally, 90° temporally, etc., in one eye as in the other. Here we would count from the upper end of the vertical meridian nasally (n) and temporally (t) down to 180°. The American method of designating the meridians of F, which I formerly recommended to preserve as being based on the physiological identity of corresponding retinal points, has no practical advantage over the designations into right and left halves. In this way, which I advocate in conformity with other oculists, for instance, Snellen, Landolt, Panas, etc., we gain a uniform mode of designation for the different branches of functional examination of the eye, astigmometry, motimetry, and campimetry."

I had a long talk with Dr. Knapp on this subject after the meeting of the Ophthalmological Society last summer, and while he convinced me, rather against my will, of the necessity of a change, he did not quite convert me to the change that he would bring us.

Perhaps the only important objection to the system that he prefers is the duplicating of numbers and the necessity of distinguishing them by some mark, such as "n" and "t," as he suggests, or by + and —, as has been suggested by Dr. Green and others. But this seems to me a very serious objection, as, in recording our cases, we desire brevity and simplicity above all things, when we can get them without the sacrifice of scientific accuracy. Even "O D" and "O S" seem sometimes a burden to overworked clinical recorders, and it is to be feared that, in the press of business, the "n's" and "t's" might sometimes get mixed or dropped, when the record would at once be without definite meaning.

The plan which I suggested and which still seems to me the most simple and, all things considered, the most favorable, is to place zero in each eye at the nasal end of the horizontal meridian, and count to 180° at the temporal end. The advantage of this plan is that whether we are designating the inclination of an axis in astigmatism, locating a position in the topography of the fundus by the ophthalmoscope, or indicating a limitation in the field of vision—the simple mention of a certain number of degrees instantly gives a definite and accurate mental picture, without stopping to consider whether the number is on the right hand or the left, or whether we are to estimate it with reference to our own eyes or the patient's.

To those of us who are inclined to be conservative and economical, it may be a point worth considering that this change would involve very little disturbance of vested interests. We would only have to change one side of our trial frames, and simply treat the left eye as we have been treating the right for so many years.

I would submit that in astigmometry, campimetry, and ophthalmoscopy this plan is not open to serious objections. The only objection that occurs to me is that it is not in accord with the language we use in designating the positions of the meridians in describing anomalies of motility.

The subject was referred to a committee composed of Drs. Risley, Harlan, and Thomson, who, at a subsequent meeting, submitted the following reports:

REPORT OF COMMITTEE ON THE DESIGNATION OF THE MERIDIANS IN ASTIGMATISM.

MR. PRESIDENT:

Your committee appointed to consider and report upon some uniform plan for the designation of the meridians in astigmatism have thought best to present their report in such shape as will leave it still open for discussion by the Section.

While the members of the committee are equally mindful of the necessity for the adoption of some uniform system in directing the manufacturing optician, in making clinical records, etc., they are not agreed as to the system which should be recommended by the Section. We are therefore under the necessity of presenting also a minority report.

The committee have considered three systems:

1st. That in most general use in this country, in which zero is placed at the end of the horizontal meridian to the patient's left and the degrees are counted in the upper semicircle to 180° at his right.

2d. That in which zero is placed at the top of the vertical meridian and the degrees are counted right and left, or rather to the nasal and temporal sides, to 90° at the horizontal meridian.

3d. That in which zero is placed at the nasal extremity of the horizontal meridian, in each eye, and the degrees are counted on the upper semicircle to 180° at the temporal extremity.

We find the first system subject to the following objections. 1. That it fails to show at a glance the interesting fact of the symmetry or asymmetry of the eyes. While it seems scarcely scientific to compare the nasal region of one eye with the temporal region of the other, this is not merely a theoretical consideration, for statistics show that in eighty per cent of cases of binocular astigmatism the principal meridians are either precisely symmetrical or within a few degrees of being so. When, therefore, we have found the inclination of the axis of the required cylinder in one eye, we know that there are eight chances out of ten of its being exactly or nearly the same, with reference to the

nasal and temporal sides, on the other. 2. The inconvenience resulting from the fact that the terms right and left must be used in a different sense for the patient and for the surgeon. The only advantage claimed for this system is that it is in accord with the numbering of clock dials and the graduation of protractors and other mathematical instruments. The conditions, however, are not the same; in mathematical studies but one person is concerned, and the terms right and left are considered in the direct sense with reference to the observer, while in refraction work two persons are concerned, and these terms are used in the direct sense with reference to the patient. This system is adapted, therefore, only to subjective testing, and introduces an element of confusion into any kind of objective examination.

The second system, with zero at the top of the vertical meridian, has a very obvious relation to the symmetry of the eyes, but is liable to the objection that the numbers are duplicated and require some sign, such as "n" and "t," to distinguish them.

The third system, with zero at the nasal extremity and 180° at the temporal extremity of the horizontal meridian in each eye, seems to us to be free from the above objections, and we would report in favor of recommending its adoption, but at the same time expressing a willingness to conform to any plan that may seem most likely to become universal.

WM. THOMSON.
GEO. C. HARLAN.

MINORITY REPORT.

After careful consideration of the views of my colleagues on the committee I have been unable to join them in their recommendation.

Before abandoning the method with which we are familiar, and which is in almost universal use in this country, we should carefully consider its advantages and scrutinize the objections that have been urged against it.

In the first place it is not only the established and well understood method in this county, but it is based upon prin-

ciples with which we have been familiar since our earliest school days, and is intimately embodied in the work and records of all scientific investigation, where the circle is a rudimentary factor in the processes employed. In our first introduction to mathematical studies we found on the protractor the left-hand end of the horizontal line designated as zero and the degrees of linear development on the arc of the circle counted upward by right ascension after the manner of the astronomer. The same method has been employed in graduating the quadrant, sextant, and the meridians as employed by the geographer and astronomer. In a word, in all the sciences where the circle is introduced the eastern, or left-hand, end of the horizon line has been adopted as the starting-point and the degrees counted upward by right ascension to the zenith. This method is indissolubly joined to the records of the mathematical sciences, and is readily understood by all. When direction is given to place the axis of a cylinder at, *e. g.*, 30°, no reference being had to spectacles, there is not an optician in the world who would not place it as desired, since it would be plainly indicated on his protractor. No one outside the realm of ophthalmology would ever think of getting behind the protractor, and thus reversing the angle. We should therefore hesitate before we divorce our ophthalmological records from a method employed universally among scientific men laboring in other fields.

If we adopt the median line of the face as zero, we not only separate ourselves from this universally understood method of estimating degrees, but it will be necessary to keep in mind a right and left ascension and we can never be sure that it will be understood without explanation, except by the initiated. In my judgment this will introduce complexity. In place of conceiving under all circumstances, a development upon the circle from left to right, we shall be compelled to conceive a development from right to left for the patient's right eye, and left to right for the left eye. At this point added confusion is introduced by the fact that our trial frames are inverted semicircles which brings the zero of their graduation to the temple side of the patient's face,

and subjects one to a constant necessity for mentally reversing the frame.

The real cause of confusion, if any, in the system we now employ is in referring the angles of deviation to the respective eyes of the patient, whereas it should, as in other things, be compared to the horizon line. Personally, I have not found difficulty in doing this, *i. e.*, in viewing the angle from the standpoint of my patient. This presents no more difficulty than in differentiating between the patient's right and left eye, examining them from the front as we usually do, the right eye being opposed to our left. This process of orientation is one we must perform in many of the details of life.

With regard to the symmetrical placing of the meridians in the two eyes, etc., I can see no practical advantage in referring them to the median line of the face, that does not obtain equally for the universal horizon line.

S. D. RISLEY.

After considerable discussion of the reports the Society failed to reach a satisfactory conclusion and the subject was indefinitely postponed.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE THIRD QUARTER OF THE YEAR 1892;

By Dr. ST. BERNHEIMER, in Vienna; Prof. HORSTMANN, in Berlin; and Dr. SILEX, in Berlin;

WITH THE CO-OPERATION OF

Dr. S. M. Burnett, Washington; Dr. Dantone, Rome; Prof. Hirschmann, Charkow; Dr. P. von Mittelstädt, Metz; Dr. Werner, Dublin; Dr. C. H. A. Westhoff, Amsterdam; Dr. Schiötz and Dr. Ole Bull, Christiania; Dr. Deus, Berlin; Dr. Herrnheiser, Prague; Dr. Sulzer, Geneva, and others.

Sections I.–XI. Translated by Dr. Ward A. Holden.

Sections I.–V. Reviewed by Dr. St. BERNHEIMER.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

TEXT-BOOKS, MONOGRAPHS, AND TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS. STATISTICAL REPORTS.

228. Trousseau. The causes of blindness in the patients of the Quinze-Vingts. *Arch. d'Opht.*, vol. xii., 4, p. 268.

229. Kuschew. Blindness and its causes in non-Russian inhabitants of the colony Staro-Slavkin in the district of Sarcatow. *Wjestn. Ophthal.*, 1892, 4.

230. De Wecker and Masselon. Clinical ophthalmoscopy, 2d ed., pp. 396, and 80 photographs; Doin, Paris.

231. De Wecker. A point in the history of ocular surgery. *Soc. franç. d'Opht.*, 1892.

232. TROUSSEAU. Hygiene of the eye. Masson et Gauthieu, Paris, 1892.

233. Report of the committee on the efficient control of railway servants' eyesight. *Brit. Med. Jour.*, July 23, p. 194.

TROUSSEAU (228) gives a report on the causes of blindness in 627 hospital patients, modelled after the report of Magnus. The predominating causes were atrophy of the optic nerve, found in 129, and blennorrhœa neonatorum, found in 30; next glaucoma and irido-choroiditis. Blindness from injury was more frequent than in Germany. Of general diseases causing blindness, tabes, syphilis, and the acute infectious diseases of childhood which favor the development of scrofula were the most frequent. In 308, almost half the cases, the blindness was preventable.

V. MITTLESTÄDT.

In a colony of 4,844 individuals, KUSCHEW (229) found 50 cases of blindness, or 19.3 to the thousand. 82 % were due to trachoma mostly with trichiasis, 6 % to measles, 2 % to blennorrhœa, 4 % to glaucoma, and 4 % to cataract. HIRSCHMANN.

DE WECKER (231) has discovered that the cataract knife, the invention of which is commonly attributed to A. von Graefe, was used by Tenon in cataract extraction and is pictured in his *Mémoires et observations sur l'anatomie, la pathologie et la chirurgie* Paris, 1806. SULZER.

TROUSSEAU'S (232) compendium presents very completely the present status of the hygiene of the eye. In the first portion, devoted to the ætiology of blindness, statistics of the asylum of Quinze Vingts are given. A second section treats of the influence of climate and race upon eye diseases. In the chapter on school myopia Trousseau speaks against the adoption of the vertical handwriting, as being too slow for practical purposes. The demands made on the eyes by the army, the navy, and the railway are fully treated of, as well as the occupations which are injurious to the eyes. An interesting section is that on the influence of heredity and consanguinity upon diseases of the eye.

SULZER.

The report (233) consists of two parts: (A) historical and (B) relating to the work of the committee, including information obtained from 48 railways, critically reviewed under the following heads: (1) The classes of men examined; (2) the examiners; (3) the methods of examination for distant vision and for color

sense; (4) the arrangements for re-examination; (5) the neglect of examination. It concludes with numerous recommendations.

WERNER.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPY.

234. PANAS. Report to the Academy of Medicine on the communication of Dr. Landolt entitled "On the abuse of mercury in the treatment of diseases of the eyes." *Arch. d'opht.*, vol. xii., No. 5.

235. VIBERT. Intramuscular injections of mercury in ocular therapeutics. *Thèse de Paris*, Steinheil ed., 1892.

PANAS (234) opposes Landolt's warning against the use of mercury in other than specific eye diseases. Panas has seen the best results from the use of mercury in non-specific diseases of the uveal tract when all other remedies had failed.

Panas has discarded enunctions of gray ointment (which is not absorbed through the skin, but from inspiration of the vapor into the lungs) on account of the inexact dosage and the stomatitis produced, and also the administration per os. In place of these methods he employs intramuscular injections of 4.5 *mgr* of biniodide of mercury in sterilized olive oil, which are well borne and cause neither local symptoms nor stomatitis.

V. MITTELSTÄDT.

VIBERT (235) believes that of all the mercury salts the biniodide is the most efficacious and causes the fewest unpleasant symptoms. He injects 0.4 of biniodide in 100 of sterilized olive oil with a Pravaz syringe.

III.—INSTRUMENTS AND REMEDIES.

236. CHISOLM. Resection of the optico-ciliary nerves. *Journ. Amer. Med. Ass.*, 1892.

237. WOODWARD. The ophthalmometer of Javal and Schiötz and the diagnosis of astigmatism. *N. Y. Med. Journ.*, 1892.

238. GUTTIEREZ-PONCÉ. Presentation of a scotometer. *Soc. d'opht. de Paris.*, March 8, 1892.

239. PARENT. A refraction ophthalmoscope with cylindrical lenses and a mirror of varying focus, which may serve as a complete optometer. *Ann. d'Oculist.*, vol. cvii., 3, p. 19.

240. PITOU. A new campimeter. *Ann. d'Oculist.*, cviii., p. 3.

241. GALEZOWSKI. The magnification of the ophthalmoscopic image in the examination of the retinal vessels. *Rec. d'opht.*, 1892, No. 9, p. 385.

242. STROHSCHEIN. On the sterilization of atropine, eserine, and cocaine solutions, with a description of a new drop glass. *Graefe's Arch.*, xxxviii., 2, p. 154.

CHISOLM (236) has performed optico-ciliary neurotomy in eighty-five cases for the relief of pain and the preservation of the eyeball, and in the majority of cases the results have been satisfactory. His method of operation is very simple. He opens the conjunctiva at the outer or inner canthus, and passes blunt scissors through the opening back until he feels the optic nerve. This is then divided and the neighboring tissues thoroughly separated. The hemorrhage is stopped by compression. The extensive ecchymoses disappear in a few weeks. If the eye is not disfigured, he prefers this operation to enucleation. He does not consider the operation dangerous. BURNETT.

WOODWARD (237) gives a tabular report of the examination of eighty-eight corneæ with the Javal and Schiötz ophthalmometer. He finds, as all careful observers have found, that the corneal astigmatism is, on the average, half a dioptry greater than the total astigmatism. The ophthalmometer is not infallible, nor are the data furnished by its use always correct. BURNETT.

GUTTIEREZ-PONCÉ (238) places a series of luminous discs of various colors, and ranging in diameter from 1-8 *mm*, one metre from the patient. As soon as the image of the disc observed exceeds the size of the amblyopic spot in the retina, the color of the disc is perceived. SULZER.

By adding a lens of + 25 D, and one of − 25 D, the focal distance of which may be varied at will, to the concave mirror used in the upright examination, PARENT (239) is able to vary the total focal distance within the limits 8 *cm* and ∞. The coating of the mirror is removed in parallel lines, through which the light from the fundus observed passes to the observer's eye. The horizontal vessels of the observed ametropic eye appear single only when the observer's eye is accurately focused for them (principle of Scheiner's experiment). This clever modification of the objective determination of the refraction renders a high degree of accuracy possible.

A specially ground cylindrical mirror may be made to correct the astigmatism of the observer. SULZER.

PITOU has constructed a transmitter by the use of which the results obtained with the campimeter may be reduced to degrees. It is thus possible to record observations on the ordinary visual field blanks which represent the projection of a hemisphere. The dimensions of the reduced campimetric visual fields are not dependent upon the distance at which they are taken, and are as accurate as when the field is taken with the perimeter. Pitou's instrument enables us to replace the cumbrous and expensive perimeter with a simple black chart. SULZER.

According to GALEZOWSKI (241) the magnification usually obtained with the upright image is not sufficient to enable us to recognize the finer changes in the retinal vessels. By placing 3 × lenses of 10,15, and 20 D, respectively, at their focal distances behind the mirror, he obtains a magnification of 60 diameters. With this ophthalmomicroscope, Galezowski has recognized an endarteritis with small arterial hemorrhages, in a case of thrombosis of the central artery. SULZER.

STROHSCHEIN (242) repeated the experiments of E. Franke in regard to infection and disinfection of collyria, and on the whole confirmed them. The ordinary dropper can be sterilized only with a steam sterilizer. The author describes a new dropper which may be held in an ordinary flame and thus glass and contents be thoroughly sterilized in a short time. The droppers are made in different colors for different solutions.

IV.—ANATOMY.

243. BOGROW. The third root of the optic nerve from the optic thalamus. *South Russian Med. Journ.*, No. 3.

BOGROW (243) experimenting in Prof. Flechsig's laboratory in Leipsic, discovered a root of the optic nerve, hitherto undescribed, which passes from the base of the thalamus into the optic tract in the region where the latter lies on the base of the brain, near the tuber cinereum. The author believes these fibres to be the path of the pupillary reflex. The fibres may extend from the thalamus to the posterior commissure and the corpora quadrigemina (the oculomotor nucleus for the pupils).

HIRSCHMANN.

V.—PHYSIOLOGY.

244. DUFOUR. On the perception of colors. *Soc. franç. d'opht.*, 1892.

245. TSCHERNING. The spherical aberration of the human eye. *Soc. franç. d'opht.*, 1892.

246. MACGILLIVARY. Report of case of central color defect, with remarks. *Brit. Med. Journ.*, July, 1892.

247. MACKAY. On the quantitative estimation of the color sense. *Brit. Med. Journ.*, Sept., 1892.

248. BICKERTON. On the association of shipping disasters with color-blind and defective-sighted sailors. *Brit. Med. Journ.*, Sept., 1892.

249. STRAUB. An instrument for the determination of convergence power and the position of rest of the eyes. *Opht. Review*, vol. xi.

250. STORY. The light streak on the retinal vessels. *Opht. Review*, xi., p. 100.

251. TSCHERNING. Contributions to the dioptrics of the eye. *Zeitschr. f. Psych. und Phys. der Sinnesorgane*, vol. iii., part 6.

DUFOUR (244) examined a case of complete color blindness in which the maximum of intensity lay in the greater part of the spectrum. At the warm end the spectrum was shortened, and at the cold end of decreased intensity. Dufour believes that these facts accord better with the Young-Helmholtz theory than with the Hering theory. SULZER.

TSCHERNING (245) found by Thomas Young's method that 50 per cent. of eyes are aplanatic. Of the other 50 per cent., the majority have positive spherical aberration, while some few have undoubtedly a negative spherical aberration. This difference may be fully explained by the variations in the form of the cornea which Sulzer has described.

Tscherning has also been able to confirm the proof furnished by Thomas Young that in accommodation the positive spherical aberration is corrected, or over-corrected. SULZER.

MACGILLIVARY'S (246) patient, a young girl, had normal visual acuteness, and recognized colors perfectly, according to Holmgren's test, but had a very small central scotoma for red and green and was unable to distinguish red and green railway signals at a distance of 300 yards. WERNER.

MACKAY (247) speaks of the varying results obtained by different observers and of the difficulty of establishing a normal standard. In the report of the Committee on Color-Blindness (Brit. Med. Asso.) no attention was paid to the quantitative perception of color. WERNER.

BICKERTON (248) in a long paper on practical points states that all witnesses in cases of naval disasters should undergo an examination as to their visual acuteness and color perception, a suggestion which had been already made by the Committee on Color-Blindness and laid before the Royal Society.

STORY (250) reviews the theories of Jaeger, Young, and Schneller which explain the light streak by reflection from the blood column, the fundus, and the convex wall of the vessel. He considers Young's theory incorrect, and on the ground of experiments and of clinical experience approves the third theory, that of Schneller. WERNER.

TSCHERNING (251) adds three new reflex images to the three Purkinje-Sanson images already known, demonstrating their existence by an apparatus and by mathematical calculation. The six reflexes have their origin as follows: 1. From the anterior surface of the cornea; 2. from the posterior surface of the cornea; 3. from the anterior surface of the lens; 4. from the posterior surface of the lens; 5. an image from double reflection from the surfaces of the cornea, only subjectively visible; 6. a second subjective image just anterior to the retina, already described by Coccius. With his ophthalmophakometer the author was able to compute all the constants of the eye with the exception of the indices of refraction. His results corresponded closely with those of Helmholtz. He found the thickness of the lens 0.45 *mm* greater.

Sections VI.–XI. reviewed by DR. HORSTMANN.

VI.—ERRORS OF REFRACTION AND ACCOMMODATION.

252. HERRNHEISER. The development of the refraction of the human eye. *Prager med. Wochenschr.*, 1892, Nos. 19 and 20.

253. COHN, H. The eyes of musicians. *Berliner Klin. Wochenschr.*, 1892, No. 12.

254. PYMSZA. Comparative studies on the relation of the refractive condition to the structure of the skull. Inaug. Dis., Dorpat, 1892.

255. STEPHENSON, S. A note upon the relative frequency of myopia among Christians and Jews. *Ophth. Rev.*, vol. xi., p. 110.

256. FALKENBURG. On the normal refraction and its natural course. Utrecht, 1892.

257. VALUDE. High myopia. Extraction of the healthy lens. *Soc. d'opht. de Paris*, Jan. 5, 1892.

258. TRUE. Surgical treatment of myopia and keratoconus. *Montpellier méd.*, 1892, No. 9.

259. JACKSON. Manifest and latent hyperopia. *Jour. Amer. Med. Asso.*, 1892, Aug. 27th.

266. TSCHERNING. The influence of the posterior surface of the cornea on the refraction of the eye. *Soc. franç. d'opht.*, 1892, May.

267. STRAUB. On muscular asthenopia. *Dutch ophth. Soc.*, 1892.

268. BULL. The relation of the irregular contraction of the ciliary muscle to astigmatism. *Soc. franç d' opht.*, 1892, May 2d.

269. BULL. Asthenopia from astigmatism. *Ibid.*

270. GALEZOWSKI. Monocular diplopia. *Soc. de Biologie de Paris*, 1892, p. 309.

271. WÜRDEMANN. What may be considered normal corneal astigmatism? from kerato-metric measurements of 300 eyes. *Journ. Amer. Med. Asso.*, Aug. 27, 1892.

272. REYNOLDS, D. S. Gradation of lenses. *Journ. Amer. Med. Asso.*, Aug. 27, 1892.

273. DAVIS, A. E. Javal's ophthalmometer and atropine in determining errors of refraction. *N. Y. Med. Journ.*, Sept. 10, 1892.

274. LAMBERT, W. E. Retinoscopy as a means of estimating astigmatism. *N. Y. Med. Journ.*, Aug. 27, 1892.

275. SPALDING, J. A. A few words on Donders' violet test for the detection of errors in refraction. *Annals of Ophth. and Otol.*, July, 1892.

276. RISLEY, S. D. The relative importance of astigmatism in the production of asthenopia. *Annals of Ophth. and Otol.*, July, 1892.

277. TILLEY, ROBERT. Monocular diplopia. *Journ. Amer. Med. Asso.*, Sept. 10, 1892.

HERRNHEISER (252), systematically examined over 11,000 eyes at various ages. 1,918 eyes of new-born infants were all hyperopic, 2.3 D on the average. Of 546 eyes in children between one and six, 24 were myopic, 130 emmetropic, and 392 hyperopic. The average hyperopia was 1.95 D. 3,826 eyes were examined

between six and twenty, in these the proportion of myopes increased from year to year. Between twenty and seventy, a change in refraction is rare. Myopia increases regularly until the twentieth year, and again in old age, the latter increase being due to senile changes in the lens. A decrease in refraction almost never occurs. The author could not verify Stilling's rule that a low orbit favored myopia. The higher degrees of hyperopia are congenital and change but slightly in the course of years.

Cohn (253) found in 62 musicians, 25 emmetropic, 3 hyperopic, 8 astigmatic, 6 amblyopic, and 20 myopic. Of the myopes, 9 were myopic when at school, and only in 6 was the myopia possibly due to their profession. Cohn does not consider Stilling's view proven, that looking downward in reading music causes myopia.

Pymsza (254) in 338 scholars, mostly of Esthic nationality, found 17.9 % of myopes. Since these people have broad faces and low orbits, and the proportion of myopes is less than in the inhabitants of Western Europe, Stilling's theory cannot be correct. The development of myopia depends on the demands made upon the eyes in modern civilization, and not upon the form of the cranium.

Stevenson (255) found that in a school of Jews and Christians mixed, there were 10 % of Jews myopic and 1.9 % of Christians. The figures are only approximate as in some cases myopia was only presumptive. Werner.

According to Falkenburg (256) the typical refraction of the new-born infant is hyperopia 2 to 4 D. This hyperopia is gradually reduced to 1 to 1.5 D, which is the normal hyperopia. By a strain of the ciliary muscle this hyperopia in middle life appears as emmetropia, and is only revealed by repeated atropinization. In old age 1 to 1.5 D again becomes manifest. In many cases of amblyopia there is manifest hyperopia, which is slightly greater than the normal latent hyperopia. Atropinization shows that this manifest hyperopia is the total hyperopia.

Valude (257) in a myope of ten, extracted the lens in one eye and made discission in the other. The visual acuteness was raised from $\frac{1}{8}$ to $\frac{1}{1}$. Discission is preferable to extraction in such cases. Sulzer.

True (258) recommends discission or extraction of the lens in high myopia. Sulzer.

As a result of his investigations Jackson (259) has found that the latency of hyperopia is essentially exceptional, inconstant, and

abnormal, and that it is not more frequent or greater in childhood than in adult life, and the practical inference is that it is usually unnecessary to employ a mydriatic to unveil the latent hyperopia when the proper means of detecting hyperopia have been employed. This consists essentially in over-correcting the manifest hyperopia and then gradually reducing the + glass by an added cylinder in testing. BURNETT.

TSCHERNING (266) calls attention to the fact that the difference between the refractive index of the cornea and that of the aqueous is greater than is commonly supposed, and that therefore the posterior surface of the cornea cannot be neglected in the dioptrics of the eye. With his ophthalmophakometer the author found the radius of curvature of the posterior surface of the cornea to be on the average 6 *mm.* It usually shows a vertical astigmatism, but as it is a concave surface the result is an astigmatism against the rule. Tscherning's attention was directed to this fact by a case having a subjective horizontal astigmatism of 1.5 D while the corneal astigmatism was only 0.5 D. Measurement of the anterior and of the posterior surface of the lens showed that the discrepancy could not be explained by lenticular astigmatism. There remained then only the posterior surface of the cornea, and direct measurement of its radii of curvature in fact partially explained the circumstances. SULZER.

STRAUB (267) calls fatigue of the extrinsic muscles muscular asthenopia. By examining the position of rest for distance and for near with his apparatus, he determines whether binocular vision is maintained with difficulty. With Hering's test of the falling balls he determines binocular vision quantitatively. In anisometropia he carefully corrects each eye. When an operation is indicated he prefers capsular advancement to tenotomy. WESTHOFF.

BULL (268) believes that all the arguments hitherto advanced in support of the existence of asymmetrical contraction of the ciliary muscle, are inconclusive. SULZER.

BULL (269) explains the fact that not all astigmatic persons have asthenopia, by the different disturbances of vision that occur in the various forms of astigmatism. SULZER.

GALEZOWSKI (270) observed several cases of hysterical spasm of accommodation, in which the accompanying symptoms, monocular diplopia and anæsthesia of the retina, disappeared after the use of atropine, or of glasses correcting the symptomatic myopia. SULZER.

WÜRDEMANN (271) has found, as have most observers, that the *cornea* is seldom free from astigmatism, not often however over 0.75 D or less than 0.25. His statement that the decrease in curvature from the apex to the periphery of the cornea is greatest in the vertical meridian, is totally at variance with the measurements of the Reporter. According to my measurements the nasal side of the horizontal meridian invariably diminishes most rapidly in refraction towards the periphery. BURNETT.

REYNOLDS (272) reviews his proposition made some years ago to number lenses, not by their focal length but by their angle of refraction expressed in degrees and fractions. BURNETT.

Indirectly DAVIS' (273) paper is pernicious and is liable to bring discredit upon JAVAL'S most valuable instrument by over-enthusiasm and claims for it that cannot be substantiated. "Atropine has had its day of usefulness in ascertaining errors of refraction. The ophthalmometer has replaced it in the offices of many oculists, and I predict, with others, that it will almost wholly take the place of the old method of testing with atropine before a great while elapses."

The ophthalmometer has occupied an important position in my office for as long a time (seven years) as in that of any other oculist in this country, I fancy, and it has not yet succeeded in running a mydriatic out altogether. It has, however, given me more certain indications for it, and so it will for others when sufficient experience and a thorough knowledge of what the ophthalmometer really does shall have taught them the true function of the instrument. BURNETT.

LAMBERT (274) is a strong advocate of the shadow test, and believes it to be as accurate as any objective test we have. He prefers, as we believe all workers now do, the plane mirrors. BURNETT.

SPALDING (275) calls attention to the test for ametropia by causing the patient to look at a bright light through a violet-colored glass, which was recommended by Donders in his treatise and which seems not to have come into use. He has found it serviceable. BURNETT.

RISLEY (275) contends for the emmetropic eye as the standard eye even though it be not the prevailing eye, and for the presence of hypermetropia as a sole factor in the production of asthenopia in a large percentage of cases. BURNETT.

TILLEY (277) has seen three cases of monocular diplopia and from

a study of these and the other reported cases he is inclined to accept as most plausible the theory of Fontan, viz., that the impressions received by each eye are transported to the right and left hemispheres respectively, and that they are fused by some communicating nerve fibres. When there is any disturbance in this communication there is monocular diplopia. BURNETT.

VII.—LIDS.

278. FLACK, J. On sarcoma of the lids. Inaug. Dissert., Königsberg, 1892.

279. BOCK. Pediculi capitis on the lashes. *Centralbl. f. prakt. Augenh.*, 1892, p. 259.

280. KRÜDENER. A contribution to the pathological anatomy of amyloid tumors. Inaug. Dissert., Dorpat, 1892.

281. DA GAMA PINTO. Contributions to ocular surgery. *Annal. d'Ocul*, cvii., p. 241.

282. SMITH, E. A new operation for trichiasis distichiasis and entropion of the upper lid. *Amer. Med. Asso.*, 1892, Aug. 27th.

283. SCOTT, K. Operative treatment of infantile ectropion. *Ophthal. Rev.*, xi., p. 108.

284. VERNEUIL. Restoration of the upper lid by epithelial grafts. *La Clinique*, 1892, Dec. 3d.

284a. EVANS, T. C. Congenital ptosis, report of a case treated by Panas' operation. *Amer. Journ. of Ophth.*, August, 1892.

BOCK (279) found in two children a scaly blepharitis due to pediculi capitis. The affection was cured by the use of gray ointment.

KRÜDENER (280) examined microscopically eight cases of amyloid tumor from the palpebral conjunctiva, and gave a detailed description of their histological structure.

SMITH'S (282) operation consists in splitting the edge of the lid as in the Jaesche-Arlt operation, and then touching the hair follicles or the tarsus with the point of the galvano-cautery or the Pacquelin cautery. BURNETT.

SCOTT (283) introduces silver-wire sutures into the substance of the everted lids, in cases of neglected purulent ophthalmia of infants, which are allowed to remain in situ for six days, the wire acting as a splint to keep the lids in position. WERNER.

VIII.—LACHRYMAL APPARATUS.

285. GAMO PINTO. Treatment of affections of the lachrymal sac. *Annal. d'Ocul.*, cvii, p. 25.

286. TERSAN. Curetting of the lachrymal sac without cutaneous incision. *Annal. d'Ocul*, vii, p. 262.

287. THOMAS, Ch. H. Stricturotomy for the radical cure of stricture of the lachrymal duct. Also a stricturotome. *Amer. Med. Asso*, Sept. 10, 1892.

288. HESSE. A contribution to the therapy of chronic disease of the tear sac. Inaug. Dissert., Berlin, 1892.

289. GRÜNBERG. A case of purulent inflammation of the tear sac, complicated with an abscess in the orbit. *Wjest. opht.*, 1892, No. 4, 395.

290. ASCHMAN. Closure of the lachrymal puncta in dacryocystitis as a barrier against infection of a wounded eyeball. *Journ. Amer. Med. Assoc.*, Sept. 10, 1892.

PINTO (285) recommends scraping out the incised sac and cauterization of the canaliculi. SULZER.

TERSAN (286) recommends scraping out the tear sac through the incised upper canaliculus in obstinate dacryocystitis before a cataract extraction is done, when injection is feared, and in similar conditions, in cases of corneal ulcer. SULZER.

THOMAS (287) believes that the only radical cure of stricture of the nasal duct is by stricturotomy, and not by gradual dilatation, and for this purpose has devised a stricturotome. This consists of a knife with a cutting blade 7 *mm* in length and 3 *mm* in width, with a blunt point in the form of a probe and dilator. This latter renders it sure of introduction, and serves to protect the soft parts in the vicinity of the stricture. After the stricturotomy he usually introduces a leaden style to be worn for a few days, till healing is accomplished. BURNETT.

When the treatment of tear sac disease by means of probes is not successful, HESSE (288) extirpates the sac. The operation always gives a good result.

According to GRÜNBERG (289) an orbital abscess was in direct connection with the blennorrhoic tear sac, and discharged when the latter was opened. Vision was lost. HIRSCHMANN.

ASCHMAN (290) recommends the closure of the puncta lachrymalia by means of the galvano-cautery in cases of wounds of the cornea where there is existing dacryocystits. He believes this

will prevent infection, and reports three cases where it has been tried in addition to other means. BURNETT.

IX.—MUSCLES AND NERVES.

291. VAN MILLIGEN. A contribution to the operative treatment of strabismus sursum et deorsum vergens. *Centralb. f. prakt. Augenheilk.*, 1892, 327.

292. VAN MILLIGEN. The anomalies of convergence. *Annal. d'Ocul*, cvii., p. 12.

293. GULLSTRAND. Differential diagnosis and photographic representation of ocular paralyses. *Hygiea*, liv.

294. DE SCHWEINITZ. Post-diphtheritic paralysis of the external recti; with a case. *Annals of Oph. and Otol.*, July, 1892.

295. HELFRICH. Paralysis of the muscles of one eye following an injury to the other. *Journ. of Oph., Otol., and Laryngol.* July, 1892.

296. BLOCQ and GUINEAU. Conjugate paralysis of the sixth pair. *Rev. des sciences méd.*, 1892, p. 120.

297. COPPEZ. A case of labio-glosso-pharyngeal paralysis. *Soc. de méd. et mat. de Bruxelles*, Oct., 1891.

298. SAVAGE. Insufficiencies of the oblique muscles and how to correct them. *Journ. Amer. Med. Assoc.*, Sept. 17, 1892.

299. PRINCE. The fourth-degree prism in the correction of hyperphoria. *Ibid*, Aug. 27, 1892.

300. STEVENS. Facial expression as influenced by the ocular muscles. *Ibid.*

301. CONNOR, LAERTUS. Heterophoria as a cause of acute rhinitis, loss of smell, and tinnitus aurium. *Ibid.*, Sept. 10, 1892.

VAN MILLIGEN (291) operated on a case of alternating sursum et deorsum vergens by advancing the left inferior rectus and tenotomizing the right superior rectus. The cosmetic result was good, but binocular vision was not obtained.

VAN MILLIGEN (292) described four additional cases of paresis of visual convergence and also two cases of paresis of voluntary convergence. He concludes from his observations that paralysis of convergence is usually due to alcoholism, and mostly associated with toxic amblyopia. SULZER.

GULLSTRAND (293) presents a new method of diagnosing ocular paralyses objectively by the corneal reflexes, and illustrates his description with a number of photographs. The procedure

is as follows: The patient stands opposite a window at 3 *mm* distance, and the observer stands before him with his back to the window. The patient fixes the nose of the observer constantly, and moves his head up and down, to the right and to the left, while the observer watches the corneal reflex from the window in both the patient's eyes. When the mobility is normal the reflex in all positions of the head covers the pupil, but when there is a loss of mobility in any direction the reflex moves in the pupil in that direction.

A plain mirror may be used to produce the reflex, or a perforated white disc such as the keratoscope may be held before the observer's eye.

For single paralysis, the author gives the following table:

A. With horizontal asymmetry when the patient looks to his right.
1. The reflex in the right pupil being displaced to the right (or in the left pupil to the left).

2. The reflex in the left pupil being displaced to the right (or in the right to the left).

B. With horizontal asymmetry when the patient looks to his left.
1. The reflex in the left pupil being displaced to the left (or in the right to the right).

2. The reflex in the right pupil being displaced to the left (or in the left to the right).

C. With a difference in height in looking up when the reflex is higher.
1 in the right pupil, and the difference in height appears when the patient looks
(α) Right.
(β) Left.
D. With a difference in height in looking down, when the reflex is lower.
1 in the right pupil, and the difference in height also appears in looking
(α) to the right
(β) to the left.
2. In the left pupil, and the difference in height also appears in looking
(α) to the left
(β) to the right.

there is:
A. Paralysis of the muscle turning the eyes to the right.
1. Paralysis of the R. ext. rect. (or weakness of this muscle in fixation with the right eye and secondary deviation of the left).
2. Paralysis of the L. int. rect. (or weakness of this muscle in fixation with the left eye and secondary deviation of the right).
B. Paralysis of the muscle turning the eyes to the left.
1. Paralysis of L. ext. rect (or weakness of this muscle in fixation with the left eye and secondary deviation of the right.)
2. Paralysis of the R. int. rect. (or weakness of this muscle in fixation with the right eye and secondary deviation of the left).
C. Paralysis of an elevator
1. of the right eye.

(α) of the right superior rectus.
(β) of the right inferior oblique.
D. Paralysis of a depressor

1. of the right eye.

(α) of the right inferior rectus.
(β) of the right superior oblique.
2. of the left eye.

(α) of the left inferior rectus
(β) of the left superior oblique

SCHIÖTZ.

In DE SCHWEINITZ'S (294) case, in a boy of four and a half years there was, three weeks after an attack of diphtheria, ptosis of left eye; paralysis of both externi, more pronounced in left; mydriasis on right side; vertical movements good; probably no accommodation. Recovery took place in the following order: Accommodation, and the right external rectus; later the left external rectus. Improvement in the paralysis of the lower extremities came in about six weeks. BURNETT.

In HELFRICH'S (295) case a man of forty-three was struck on the right eye, at the inner canthus most probably, causing a fracture of the lachrymal bones—as there was emphysema—and there was paralysis of all the muscles except the ciliary. There was accompanying this a slight ptosis and ophthalmoplegia of the fellow-eye, there remaining only a slight pupillary reaction.

The patient made a good recovery in about ten weeks.

BURNETT.

BLOCQ and GUINEAU (296) observed a typical case of nuclear paralysis of the abducens. In a case of left hemiplegia without facial paralysis in a man of sixty-two, there was a paralysis of the abducens with a conjugate inaction of the left internal rectus which acted however in convergence, diplopia, dizziness, and a feeling of being drawn to the left.

At the autopsy they found a tubercle of the bulbus, including the right abducens nucleus and the pyramid of the same side without affecting the nucleus of the facial nerve. This renders it probable that the right abducens nucleus sends fibres to the left internus. SULZER.

COPPEZ'S (297) case of bulbar paralysis was complicated with complete ophthalmoplegia.

In cases where SAVAGE (298) has found insufficiencies of the oblique muscles according to his double prism test, he has recently been treating the condition by a shifting of the axis of the cylinder in such a way as to increase the work of the faulty muscle and thus give it a gymnastic exercise. No cases are reported of its good effect. BURNETT.

PRINCE (299) relates some cases of very slight hyperphoria attended with headache and other reflex nervous symptoms which disappeared under the use of a quarter degree prism.

BURNETT.

STEVENS (300) points out the influence which disturbance in the equilibrium of the ocular muscles exercises upon the expres-

sion of the countenance. For instance, in exophoria the brows are usually raised; often sharply arched; palpebral fissure often wide; upper lid rather conspicuous; upper lip long; corners of the mouth often drawn up; the mouth curving down in the centre; lower part of the face usually narrow; principal grooves of the face more vertical than with esophoria. And so on for esophoria and hyperphoria. BURNETT.

CONNER (301) reports an instance of esophoria of 12° which was the cause of a rhinitis, loss of smell, tinnitus aurium, and symptoms of general nervous prostration. There was nothing else to which the symptoms could be referred, and they all disappeared permanently when the exophoria was corrected by prisms. BURNETT.

X.—ORBIT.

302. CROSS, F. RICHARDSON. Three cases of empyema of the frontal sinus. *Ophth. Rev.*, vol. xi., p. 221.

302A. MAYDL. Demonstration of a tumor removed from the frontal bone of a girl of fifteen. *Zeitschr. der czechischen Aerzte*, March, 1892.

303. PULVERMACHER, E. Pulsating exophthalmus. *Centralbl. f. prakt. Augenhk.*, 1892, p. 330.

304. MITVALSKY. On cysts of the orbit, with micro- or anophthalmus. *Arch. f. Augenh.*, vol. xxv., p. 218.

305. WEISS, L. On the condition of the orbits in persons with but one eye. *Arch. f. Augenh.*, vol xxv., p. 423.

306. v. NOORDEN. A case of Thiersch transplantation of the entire orbital cavity. *Berl. klin. Wochenschr.*, vol. 92, No. 41.

307. COHN, G. A case of traumatic exophthalmus. *Zehender's klin. Monatsbl.*, vol. xxv., p. 337.

308. JACKSON, E. Ivory exostosis or bony tumor of the orbit. *Jour. Amer. Med. Asso.*, Sept. 10, 1892.

309. DE WECKER. On hernia of the orbital fatty tissue. *Progrès méd*, March 19, 1892.

310. FROTHINGHAM. A case of rare form of orbital tumor. *Jour Amer. Med. Asso.*, Sept. 10, 1892.

CROSS (302) records in the first instance an ordinary case of empyema in a boy aged seventeen, who was almost cured by drainage through orbit, when he was lost sight of. In the second

case, a girl aged eighteen, with great distension of the sinus, death resulted from meningitis after an operation involving removal of inner wall of orbit and scraping interior of cavity with a blunt spoon. There was no bone disease and no direct opening into the cranial cavity. The age of the third patient was only thirteen and one half; in his case drainage through the nostril brought about a cure. Case 2 was said to have originated from scarlatina. All recorded cases are over twenty years of age. WERNER.

MAYDL (302A) removed without difficulty an osteoma of the frontal bone weighing 180 *g.*, situated at the inner third of the supraorbital arch. There were several hard nodules on the frontal bone and at the inner canthus and the root of the nose. The entire inner half of the frontal bone was protruding, the eyeball displaced downward and outward, the acuteness of vision somewhat reduced. The mobility of the eyeball was but partially preserved. There were no cerebral symptoms.

The patient did well after the operation. Maydl stated that, of the twelve cases so operated, only two have lived.

PULVERMACHER (303) reports the case of a girl of twelve who had fallen, sustaining a fracture of the base of the skull, after which a left pulsating exophthalmus developed. After ligature of the common carotid the exophthalmus gradually disappeared.

According to WEISS' (305) observations, when the lost eye had been staphylomatous the orbit was larger, and when the eye was phthisical the orbit was smaller. When the ball had been enucleated the orbit was smaller, but when the enucleated eye had been staphylomatous the two orbits were mostly of the same size.

In COHN'S (307) case after a fracture of the inferior wall of the right orbit, an enophthalmus developed, the right eye being sunken 9–10 *mm* behind the level of the left and at the same time being lower.

In JACKSON'S (308) case the tumor appeared at the outer two thirds of the orbit, though its origin was from the upper inner angle. The displacement of the eye was directly forward and downward. There had been no squint or diplopia and no marked weakness of the ocular muscles. The tumor was of ivory hardness but was rather easily penetrated by a hard drill; vision was preserved and the movements of the eye were restored in a few weeks. BURNETT.

De Wecker (309) describes a hernia of the orbital fatty tissue, a protrusion of this tissue under the skin, that in normal and premature senescence is observed chiefly in the lower lid. The relaxation of the tarso-orbital fascia, the partial atrophy of the orbicular muscle, and a general deposition of fat are the causes of this condition. When the protrusion is in the upper lid it causes senile ptosis. The hernia may be of traumatic origin. When the margin of the lid is pressed against the orbital margin the prolapsed fatty tissue is forced back into the orbit, and thus this affection may be distinguished from œdema of the lid.

Sulzer.

Frothingham's (310) case is interesting from the fact that the tumors were of approximately the same size, and occupied exactly the same position in either orbit. These had developed successively since 1890, that in the left orbit first, and came, apparently, from the connective tissue of the orbit. They were of a sarcomatous character with admixture of fibrous tissue.

Burnett.

XI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

311. Wolffberg. On the prophylaxis of gonorrhoic ophthalmia in adults, and the therapy of blennorrhœa neonatorum. *Therap. Monatsbl.*, Dec., 1892.

312. Parinaud. Conjunctivitis due to streptococci. *Annal. d'Ocul.*, vol. cvii., p. 88.

313. Muttermilch. Anatomy of chronic inflammations of the conjunctiva. *Ibid.*, p. 328.

314. Westhoff. On the treatment of trachoma. *Dutch Ophth. Soc.*, 1892.

315. Weeks. The surgical treatment of trachoma. *Amer. Med. Assoc.*, Sept. 3, 1892.

316. Chevallereau. Diffuse trachoma. *Soc. d'opht. de Paris*, Jan. 5, 1892.

317. Abadie. Surgical treatment of granular conjunctivitis. *Soc. franç. d'opht.*, May 2, 1892.

318. Viger. A study of granular conjunctivitis in Algeria, particularly in reference to surgical treatment. *Annal. d'Ocul.*, vol. cviii., p. 175.

319. Straub. On the ætiology of the so-called scrofulous inflammations. *Arch. f. Augenh.*, vol. xxv., p. 416.

320. RUMSCHEWITSCH. On hyaline and amyloid degenerations of the conjunctiva. *Arch. f. Augenh.*, vol. xxv., p. 363.

321. BERENGER-FÉRAUD. Note on the kerato-conjunctivitis caused by the venom of a serpent of Senegal. *Arch. de méd. navale et coloniale*, April, 1892.

322. LAGRANGE. On epithelioma of the bulbar conjunctiva, and particularly of the sclero-corneal margin. *Soc. franç. d'opht.*, May 2, 1892.

323. MALGAT. Quadruple pterygium in each eye. *Rec. d'opht.*, 1892, p. 407.

324. WOODS, HIRAM. Diphtheritic conjunctivitis; report of two cases with bacteriological study of the false membrane. *Med. News*, Aug. 20, 1892.

325. WÜRDEMANN. Gonorrhœal ophthalmia through infection by medium of an artificial eye. *Ophth. Record*, Sept., 1892.

WOLFFBERG (311) uses a 4 per cent. solution of alum for cleansing the conjunctiva before employing nitrate of silver.

The affection observed by PARINAUD (312) is characterized by the following clinical signs: marked superficial and deep injection of the conjunctiva, the bulbar conjunctiva often appearing moist; moderate swelling of the conjunctiva; scanty secretion; moderate swelling of the lids. Corneal complications are rare, but iritis is frequent, being mostly associated with an acute or chronic inflammation of the tear sac. The use of van Swieten's solution gave the best results.

The secretion of this conjunctivitis contains many streptococci and pure cultures of this microbe were obtained. SULZER.

The second portion of MUTTERMILCH'S (313) paper describes the development of the follicle and the epithelial changes caused by its growth. The author traces the transition from the subepithelial collections of round cells of acute conjunctivitis to the "characteristic" trachoma follicle. He comes to the conclusion that all follicles are produced by the same anatomical process, and that trachoma is not a distinct form of disease. SULZER.

WESTHOFF (314), after reviewing the various methods of treating trachoma, states that he has obtained the best results by pressing out the follicles with the thumb nails or with Himley's forceps, and then rubbing in: 1000 sublimate solution, or instilling sulphate of copper in 10 % glycerine, or massage with yellow ointment. Excision of the retro-tarsal fold he found unnecessary and always injurious. WESTHOFF.

WEEKS (315) gives quite a full history of the various operative procedures that have from time to time been instituted for the radical cure of trachoma. His own experience has led him to the following conclusions: In the first stages the most efficient method is that of expression, combined with superficial scarification and the introduction of a germicide by the use of a brush. In the second stage "grattage" is the best method, combined with expression in some cases. Canthotomy is generally advisable in such cases. BURNETT.

CHEVALLEREAU (316) presented a man of sixty-three, in whom the conjunctiva of all four lids as well as the left cornea and a portion of the right were covered with hard nodular granulation tissue. SULZER.

STRAUB (319), in cases of phlyctenular inflammation, examined the crusts of the accompanying eczema and found in every case the staphylococcus aureus and albus. Inoculation of the rabbit's cornea produced a small vesicle filled with opaque fluid, which lasted four days. The picture was very similar to that of a spontaneous phlyctenula.

BERENGER-FÉRAUD (321) report four cases in which the venom thrown a certain distance by a snake found in Senegal produced a severe conjunctivitis and keratitis in man. The snake is black and attains a length of 2 *m*. SULZER.

LAGRANGE (322) considers the epithelioma of the limbus to be a malignant neoplasm, and regulates his operative procedures accordingly. Valude in the discussion spoke of several cases of this affection which ran a benign course for a long time. SULZER.

MALGAT (323) observed a case with four pterygia in each eye. The affection was congenital and so regular that each ball seemed to exhibit a Maltese cross. SULZER.

From a study of the literature of the subject and from an examination of the pathological products in some cases under his own observation, WOODS (324) concludes that there are two forms of membranous conjunctivitis, commonly known as the croupous and diphtheritic, but that they cannot be differentiated clinically since the lids may be soft and uninfiltrated in the diphtheritic form, and hard in the croupous variety. The danger to the eye is always in proportion to the lid complication; the differential diagnosis can be made only from a bacteriological examination, when the presence of the Loeffler bacillus indicates the existence of true diphtheria. BURNETT.

WÜRDEMANN (325) reports a case where gonorrhœal infection of the conjunctiva of an anophthalmic orbit took place by means of the insertion of an artificial eye. The other eye became affected, and a large corneal cicatrix followed, but some vision was saved by means of an iridectomy and massage, which the author thinks helped in the clearing up of the cornea.

BURNETT.

326. LAGRANGE. Two cases of interstitial keratitis treated by subconjunctival injections of sublimate. *Rec. d' opht.*, 1892, p. 522.

327. VOSSIUS. On parenchymatous keratitis. *Deutsche med. Wochenschr.*, 1892, No. 47, p. 1071.

328. HALTENHOFF. Dendritic keratitis or herpes? *Ann. d' Ocul.*, cvii., p. 401.

329. EMMERT, E. Dendritic keratitis and herpes. *Centralbl. f. prakt. Augenh.*, 1892, p. 355.

330. HESS. On the cause of striped keratitis after cataract extraction. *XXII. Report of Heidelberg Ophth. Soc.*, 1892, p. 144. (*Folding not infiltration.*)

331. BLANQUINQUE. A case of melano-sarcoma of the cornea. *Rec. d' opht.*, No. 4, p. 92.

332. CHATINIÈRE. Sarcoma of the cornea. *Montpellier méd.*, 1892, No. 8, p. 156.

333. GIBSON, ROBT. Treatment of keratoconus by means of the galvano-cautery and iridectomy. *Journ. Amer. Med. Assoc.*, Sept. 10, 1892.

334. SULZER. The optical correction of kerataconus, irregular and cicatricial astigmatism. *Annal. d' Ocul.*, cvii., p. 320.

In interstitial keratitis of heredito-specific origin, LAGRANGE (326) saw rapid recovery after the subconjunctival injection of sublimate, while this treatment was useless in interstitial keratitis of other origin.

SULZER.

VOSSIUS (327) presented a case of annular parenchymatous keratitis. Two thirds of the cornea were diffusely opaque, and the epithelium was rough. A narrow portion of the periphery of the cornea was transparent. Within the opaque zone there was a grayish-white, intense opaque ring 1 *mm* in width, and at the margin of the diffuse opacity a second smaller intensely opaque ring. The patient, a man of thirty-six, exhibited no sign of syphilis.

HALTENHOFF (328) discusses the question whether the branched keratitis of Hansen Grut and the dendritic keratitis of Emmert are, as Haab believes, identical with Horner's herpes of the cornea. He concludes that besides the frequent herpes of the cornea there is a corneal affection, probably mycotic, similar to herpes in the form of the ulceration, but clinically different. SULZER.

EMMERT (329) believes that dendritic keratitis is not the same as herpes. With the former there is no febrile reaction, and all the patients have a scrofulous dyscrasia. The disease begins as a subepithelial gray opacity, from which branches spread out. The swollen epithelium is cast off. A certain similarity to the form of the infiltration in herpes does not prove the identity of the two diseases.

BLANQUINQUE (331) observed a case of melano-sarcoma of the cornea diagnosed histologically, in which there was no return in six years, after removal, and cauterization of the pedicle with the galvano-cautery. SULZER.

CHATINIÈRE (332) saw a rapid recurrence after the extirpation of a sarcoma of the cornea and cauterization of the stump. SULZER.

GIBSON (333) gives a case of keratoconus where vision was $\frac{1}{200}$, in which he perforated the apex with a galvano-cautery needle. When the cicatrix finally healed vision was $\frac{30}{100}$, and, after an iridectomy was made, with + 5.5 axis 15, it was $\frac{20}{20}$. The other eye was operated on in the same manner and with an equally good vision, but with — 8.0— 3.0 120°. BURNETT.

The study of the form of the cornea in keratoconus and in certain forms of irregular and cicatricial astigmatism led SULZER (334) to the conclusion that a satisfactory correction of the refractive error could be obtained by a contact glass only. He has had a light contact glass (440 *mgr*) composed of a central spherical portion the size of the cornea and of a scleral ring, ground from a piece of crystal glass. The results obtained encourage further experimentation. SULZER.

MISCELLANEOUS NOTES.

ANNOUNCEMENT OF BOOKS.

1. C. SCHWEIGGER. Lehrbuch der Augenheilkunde. 6th edition. Hirschwald, Berlin, 1893. 510 pages, 33 drawings. The text-book of Schweigger, long and favorably known, also by a translation into English, has, in this 6th German edition, preserved its distinctive features, condensation and clearness in the description of symptoms of disease and of physical and pathological conditions, as well as precision and excellent judgment in the rules for treatment. The functional diseases receive their share of attention, 165 pages. For the objective determination of refraction the author describes the ophthalmoscopic examination in the erect and inverted (Schmidt-Rimpler) images and schiascopy. He describes at length Helmholtz's ophthalmometer, and says that for the determination of astigmatism he prefers the real ophthalmoscopic image to the ophthalmometer of Javal-Schiötz. The specialist will miss many things in Schweigger's book. This is explained in the preface. The present edition has been somewhat reduced in bulk but considerably increased in contents, because the writer has been faithful to his object, not to write a cyclopedia for specialists, but a text-book for students and practitioners. H. K.

2. EMILE BERGER. Anatomie normal et pathologique de l'œil. Ouvrage couronné par l'Institut (Académie des Sciences). 425 pages, 31 figures in the text, and 12 plates. Octave Doin, Paris, 1893. This is a praiseworthy work, clearly written, and most handsomely gotten up, which every progressive oculist will like to have on his shelves for study and reference. Researches in normal and pathological anatomy are so much scattered in peri-

odicals and pamphlets that it is a great convenience to have collected in one volume all that is of importance up to date. The author being so favorably known we need not specially mention that he was the right man for the task. H. K.

3. NEW YORK EYE AND EAR INFIRMARY REPORTS. Vol. I., part 1. Jan., 1893. G. P. Putnam's Sons. Price $1.25.

The N. Y. Eye and Ear Infirmary, the oldest and largest institution of its kind in America, shows its progress not only in the increase of its charitable work, but also in placing the medical experience it furnishes to its staff, students, and visitors at the reach of the profession at large, by publishing, at irregular intervals, a collection of papers based on observations and investigations made in the hospital and laboratory. The first number, consisting of seven ophthalmological and seven otological papers (which will be analyzed in our systematic report on progress), introduces the publication with the following statement:

"The Surgical Staff of the N. Y. Eye and Ear Infirmary, desiring to make known the professional work of the several departments of the Institution, have decided to publish a small volume of original articles which will appear at intervals as material shall be collected.

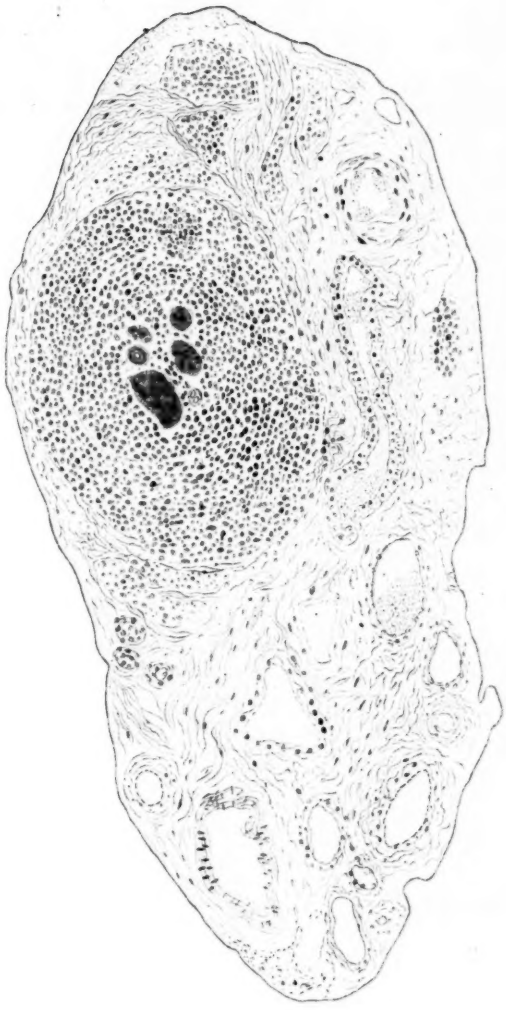
"PUBLISHING COMMITTEE: Richard H. Derby, M.D., Chairman; Gorham Bacon, M.D.; Frank L. Ives, M.D.; William S. Dennett, M.D., Secretary; John E. Weeks, M.D., Editor."

4. G. A. BERRY. Diseases of the Eye. A practical treatise for students of ophthalmology. 2d edition. Lea Brothers & Co., Philadelphia, 1893. Cloth, $8.00. This new edition, revised and considerably enlarged, of Mr. Berry's excellent work, is a handsomely gotten up volume of 745 pages, with 197 illustrations. The book distinguishes itself from other text-books: 1, by the great number (87) of beautifully colored drawings in the text, forming with the uncolored figures a small ophthalmological atlas; 2d, by the mathematical presentation of the laws of refraction of a combined optical system, which are found only in special treatises, such as Helmholtz's *Physiological Optics*, Donders', Mauthner's, and Landolt's treatises on *Refraction*, and in Graefe-Saemisch's *Handbuch*, also Hirschberg's new text-book. The book may be highly recommended. H. K.

SOCIETY MEETINGS.

BRITISH MEDICAL ASSOC.—Sixty-first annual meeting, New-Castle-on-Tyne, Aug. 1–4, 1893. The section on Ophthalmology will hold its meetings Wed., Thurs., and Frid., Aug. 2d, 3d, and 4th. President, G. E. Williamson, F.R.C.S..; Vice-Presidents: John Walton Browne, M.D.; G. Hartridge, F.R.C.S.; Hon. Secs.: Alfred N. Godby Gibbs, L.R.C.P. Lond., 27 Chandos Road, Bristol; Archibald S. Percival, M.B. Cantab., 16 Ellison Place, Newcastle-on-Tyne.

CORRECTION.—In the "Progress" of OPHTHALMOLOGY of the January (1893) issue, No. 202 (Extraction of Foreign Bodies from Eyeballs) should have been attributed to Dr. S. B. St. John instead of Dr. St. John Roosa.



Dr. E. Krüger ad nat. del. Verlag v. J. F. Bergmann, Wiesbaden. Lith. Anst. v. C. Hirst, Leipzig.

Fig. 1.

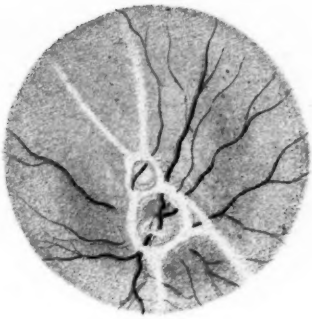
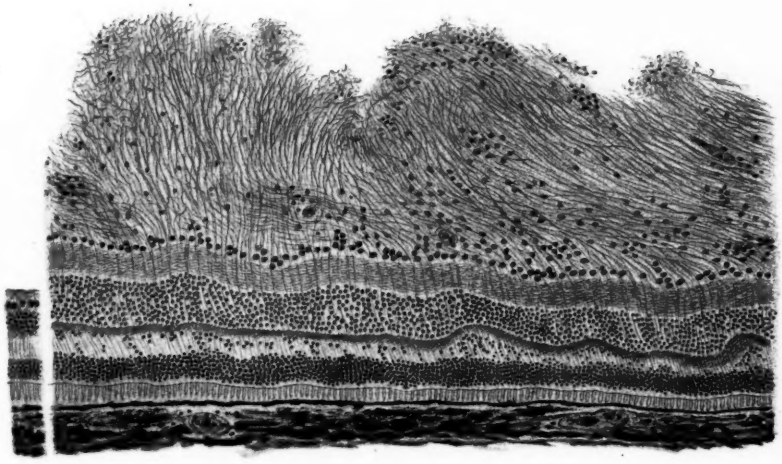


Fig. 2.

Fig. 3.



M. Barholzer del.

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